The Canadian Medical Association Journal

Vol. 52 TORONTO, MAY, 1945 No. 5

NEW ASPECTS OF VIRILISM*

The Address in Medicine before the Royal College of Physicians and Surgeons of Canada

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VIRILISM or masculinization, corresponding to a mitigated female hermaphroditism, may be defined as a partial sex reversal occurring in the female. It is essentially featured by retrogression of the normal female traits and appearance of secondary male characters. The defeminization is shown by dysmenorrhœa, amenorrhœa or profuse uterine bleeding and by progressive atrophy of the breasts. At the same time a more or less strong beard appears; the pubic escutcheon becomes lozenge-shaped and the body may become covered with hair; the voice deepens and the larynx may protrude; the clitoris hypertrophies and may attain penis-size; the bodily contour is modified towards the male pattern and the psychological outlook and instincts are often those of maleness.

The occurrence of this sex reversal can only be explained by admitting an intrinsic ambisexuality of the organism.

The actually available phylogenetic evidence tends to show that ambisexuality pervades all living matter, from "the dawn of sex" in Paramecium and "the dawn of sex differentiation" in that border-line species of Volvox (Jordan and Kindred), through simultaneous, alternating or successive hermaphroditism with or without parthenogenesis, to species as high as some fishes.

The gonochoristic stage, *i.e.*, the separation into sexes with either exclusively male or female gonads, seems to have evolved from such a hermaphroditic ambisexual condition, although some authors (Caullery) believe the evolutionary sequence to be the reverse. It is the rule in vertebrates and particularly in mammals. But even in the higher forms, including man, ambisexuality manifests itself during ontogenesis and may persist in some species as latent hermaphroditism with a potential morphological substrate.

During early embryonic life, after a period of morphological indifference, two pairs of gonoducts are present, the Wolffian and Müllerian ducts: the first with a male, the second with a female destination. The gonads themselves show two different outgrowths of the germinal epithelium: the primary and secondary sex cords. The former are formed in all gonads destined to become either a testis or an ovary. In the first case they are transformed into definitive seminiferous tubules, but in the gonad evolving into an ovary they are transitory, disappear after having extended as medullary cords into the depth of the gland and are followed by a second generation of cords: the cortical cords or Pflüger's tubules, or by their equivalent in the human species of a homogeneous cellular mass, which will become the definitive cortex. The first set of cords in the medulla of the ovary is, therefore, morphologically homologous to the early testis. In the testis, where only one set of cords occur, the bisexual organization is less striking. But in many birds and even in certain mammals structural homologue of ovarian cortex may appear and persist for a very short time. "It is obvious from these considerations that in both sexes the embryonic gonad has a bisexual organization" (Willier). The more fully developed and longer lasting male equivalent in the ovary, compared to the much shorter and less pronounced female counterpart in the testis, may explain the greater ease of sex reversal, spontaneous or experimental, from female to male. In the male toad, however, an ovarian equivalent persists during entire life as Bidder's organ.

These morphologieal manifestations of bisexual organization are supplemented by hormonal ambisexuality. In the horse and in the human species recent investigations have shown androgens as well as œstrogens being excreted

* Delivered at the fifteenth Annual Meeting, Ottawa, October 28, 1944.

together in the urine of either male or female (Gallagher *et al.*). There is also evidence, that androgens are elaborated in the ovary itself (Womack and Koch; Hill).

In gonochorists, their intrinsic bisexuality notwithstanding, one set of primary and secondary sex characters develops predominantly, whereas that of opposite sign atrophies and leaves only vestiges in extrauterine life. This prevalence, *i.e.*, the establishment of one sex or the other, is genetically determined at the moment of fecundation and finds a morphological expression in the heterochromosomes or allosomes, which differ in number, size or shape in the two sexes. One must, however, beware of considering male- and femaleness as due to single genes, which were exclusively localized in the allosomes, and the representation of sex in genetic formulas by the simple symbols of M and F is an error (Guyenot). The work of the contemporary geneticists (Goldschmidt; Correns; Bridges) leaves but little doubt that sex is determined by an entire set of genes, some of which may even be located in autosomes. The ambisexual organization of the gonads presumes that in each individual genes of a sign opposite to its own sex are present, but remain latent. Bridges holds that the genetical analyses and experiments are in favour of a simultaneous action of many genes with different tendencies and potentialities, leading thus to some sort of equilibrium, where the sexual genes are not only balanced against each other, but also against the somatic genes, and which is known as the "genic balance theory" of that author. The prevalence of one or the other set of sexual and associated genes makes the balance dip towards the male or female direction. The intensity of the deviation may vary from one species to another and thus explain some experimental discordances and the difference in frequency of some sex disturbances in various species.

The importance of the genetic sex determination, of which the heterochromosomes are a very precious expression, but which may have a deeper metabolical foundation (I should refer here to Dr. Draper's last year's lecture, in which he linked femaleness to conservation of energy and maleness to its expenditure) is obvious; it explains the equality or near-equality of the sex ratio and the sexual identity of all monochorial twins and plural births, of which the Texan armadillo with its regular, one-sexed quadruple litter has become the classical example. In some species, like insects, the rôle of these genetic factors may be absolute in sex determination, but in others it is much less exclusive and may be modified, even over-ridden and reversed, by extrinsic, environmental influences. Such is the case in many vertebrates, birds and mammals included.

From the numerous experimental and accidental observations only a very few can be mentioned here. Benoit and Domm, showed, independently of each other, that after removal of the left ovary in the chick the rudimentary right gonad changes into a testis with spermatogenesis. This may also happen spontaneously, when the left gonad is destroyed by a tuberculous process. Crew obtained from a normal hen, which was fertilized by such a masculinized hen, two normal chicks—one male, the other female—which appear thus to be without a father, but with two mothers—genetically speaking. In amphibians Harms and Kitty Ponse got an opposite result: after total castration of male toads the rudimentary organ of Bidder transformed into a functional ovary. Miss Ponse not only observed the laying of eggs by these feminized males, but had them fertilized by a normal male toad and obtained a numerous progeny, realizing for the first time cross-breeding between male and male. If Crew's chicks had no father, the tadpoles of Kitty Ponse had no mother—always genetically speaking—but two fathers. Now, the genetical chromosomal formula remained female in the spermatogonias of the masculinized hen and male in the eggs of the feminized toad. That means, that ambisexuality may even extend into gonocytes and that the genetically active factors may be over-ridden even in these cells.

Less spectacular, but as valuable results in sex reversal were obtained in amphibians through over-ripening (Kuschakewitsch; R. Hertwig) or drying (King) of eggs or through heightening or lowering of the hatching temperature (Witschi). Burns; Humphrey; Witschi succeeded in modifying and reversing the sexual development through ingeniously varied experiences of parabiosis or of heterosexual grafts in amphibian embryos. Burns, in particular, demonstrated in his now famous diagram, that the change from male to female or from female to male is accompanied by a change in the medullary and cortical portions of the gonads: the cortex expands in the glands becoming female and the medulla in those becoming male, each to the

detriment of the opposite part. Witschi has shown that concurrently the gonocytes migrate from one portion into the other, *e.g.*, in a female becoming male they leave the evanescent cortex and enter the developing medulla, where they become spermatogonias. This behaviour has even led this author to assume that the male or female potency of the indifferent gonocytes depended less upon their intrinsic genetical constitution, than on their situation in the cortical or medullary part of the gonad, and to link this "cortico-medullary antagonism" with the action of the genetic sex determiners. According to his "theory of localized sex-differentiators" or "cortico-medullary inductors and inhibitors" the male or female genetic factors act only in directing the embryonal differentiation of the medulla or of the cortex of the primary indifferent gonad. The cortex, evolving into an ovary, would then produce hormone-like inductors, which stimulate the development of the Müllerian ducts, whereas the medulla, the primordium of the testis, would give inductors stimulating the Wolffian ducts. There would, thus, be a transfer from genic to inductor or hormone control.

The influence of hormones on sex differentiation is illustrated by the case of the free-martin in cattle (Lillie; Tandler and Keller). The free-martin is a genetically female twin with internal male genitalia, but sterile testes, the sex of which has been modified by the endocrine substances of his normal male co-twin through accidental vascular anastomoses between the two chorionic circulations. Similar results have been obtained experimentally through injection of œstro- and androgenic substances, although some of them are objected to by some authors. The histo-physiological investigations of Bouin and Ancel and their co-workers were among the first to demonstrate the endocrine influence on the development of the secondary sex characters.

Although these various observations and results can not be transposed entirely from one species to another, it is nevertheless very probable, that at least the fundamental processes may be applied to most of them, including man, and that they may be summarized thus: ambisexuality is a character pervading all living matter and in gonochoristic species sex differentiation may become independent from sex determination and lead to intersexual types.

HUMAN VIRILISM

In the case of human virilism the disturbances can be definitely attributed to endocrine factors. In almost all cases these factors have some hyperplasia or tumours as an anatomical substrate, to which an endocrine hypersecretion or dysfunction can be traced.

Medical literature commonly distinguishes between three masculinizing tumours: (1) cortico-adrenal hyperplasia, adenoma or carcinoma; (2) arrhenoblastoma, and (3) luteoma.

The one unquestionable and unquestioned fact is, that some hyper- or neoplastic tumours arising from adrenal cortex tissue, either in its normal situation or from occasionally displaced cell groups, may be accompanied in the young girl and the sexually active or climacteric woman by characters of more or less pronounced defeminization and masculinization, in which hirsutism is often outstanding. This adreno-genital syndrome was first thought to rest upon an embryological basis: both the gonads and the adrenal cortex arise side by side from the genital ridge (or mesonephric blastema in amphibian and birds (Witschi)); it was suggested that some gonadal rudiment of testicular potency could have been displaced into the cortex, but such a displacement has never been authenticated and would be in disagreement with the typically adrenal cytological features of the tumours. The reverse, however, is a quite common occurrence and we can substantiate on our own material the displacement of cortico-adrenal tissue into the neighbourhood of the sex glands, where we found them in 36 cases in the mesovarium and large ligament of fetuses, girls and women up to 65 years of age, and 8 times in the peritesticular tissues. These aberrant nodules or cell-nests are functionally silent, but may become the starting point of a heterotopic cortico-adrenal adenoma or carcinoma near the ovary. On the other hand, many of these ortho- or heterotopic tumours are unaccompanied by any endocrine disturbance, although they are morphologically identical with those promoting virilism. Grollman thought a peculiar androgenic zone, the x-zone, to exist during intrauterine life, but failed (with Gersh) in furnishing any concluding evidence of its activity.

The problem seems, therefore, to restrict itself chiefly to one of hormonal order. Although the experimental work with implants and extracts of adrenal cortex gave very contradictory

results, there is little doubt left that the virilizing principle is formed in the cortical tissue. Reichstein (1936) and Broster and Vines (1937) isolated from this tissue and from urine of women with adrenal virilism androgenic substances, which are different from the other androgens and present a close chemical relationship with corticosterone. In view of the absence of distinct androgenic cells and of the morphological identity of cortico-adrenal tumours with and without masculinizing effects, it seems more likely that these androgenic substances "are merely products of perverted function of the true interrenal cells which, under normal conditions, secrete the life-sustaining principle" (Hoffman).

The riddle of the adreno-genital syndrome may, thus, be expected to be solved through biochemical rather than through histological and embryological investigations.

The latter are, however, able to explain—at least in part—the etiology and pathogenesis of virilism due to arrhenoblastoma. This rather hybrid name, coined by Robert Meyer and implying a physiological concept in a morphological tumour class, applies to those virilizing tumours of the ovary, which are featured by the presence of more or less typical testicular tubules or strands resembling sex cords, between which are often embedded clusters of lipoid-laden interstitial cells of the Leydig type. In some cases the general aspect is sarcoma-like, but a few tubular or columnar structures are generally present, resembling those of the more typical tumours. Where the latter and interstitial lipoid cells are lacking, we believe any objective histological diagnosis to be impossible. Indeed, the very atypical and indifferent tumours reported as arrhenoblastomas were classed as such rather by reason of the existing virilism, than by their intrinsic histological and cytological characters. One may be tempted to attribute their masculinizing effect to the presence of Leydig cells and even suspect some sarcoma-like tumours to be composed of very degraded cells of this type —in analogy for instance with the very indifferent looking, but highly potent hyperfeminizing theca cell tumours—but some authors (Novak) believe it to be unlikely. But whatever the ultimate fate of these atypical cases may be, the typical forms of arrhenoblastomas with testis-like tubules or cords and Leydig cells are in accord with the embryological bisexual organization of the ovary and may be derived from accidentally persisting elements of the medullary sex cords.

A third virilizing tumour of the ovary is known as "luteoma". This very rare, but much debated type is featured by its gross and microscopical likeness to normal corpus luteum tissue, which is overwhelmingly due to its lipoid content. One may agree with Schiller and with Novak, that only a very few of the reported "luteomas" belong to a new tumour entity, whereas most are probably cortico-adrenal tumours arising from heterotopic cell nests near the ovary. But there remain at least three or four cases, where the histological features can hardly be reconciled with an adrenal origin. They are thought to have arisen from granulosa or theca cells, which had differentiated into luteal cells, as is the case in the normal corpus luteum evolving from a ripened follicle. It is rather surprising that such an exquisitely female and often feminizing tumour as a luteinized granulosa or theca cell tumour should have any masculinizing effect. Hoffman believes that the curious association of virilism and some luteomas might perhaps be explained on the basis of the close chemical and biological relationship existing between progesterone and testosterone. The question would thus be prevailingly one of chemistry as in the case of the adrenal virilizing tumours. But there might be another explanation; it is possible, not to say probable, that these so-called "luteomas" are entirely unrelated to either granulosa, theca or corpus luteum cells, but derive from heterosexual elements, which are always found in the hilus of the ovaries of normal adult women and sometimes in the ovaries themselves. Indeed, in two cases published as masculinizing luteomas from which I had the opportunity of studying slides I could convince myself, that one (Cosacesco, Draganesco, Georgesco and Dinitschiotu) was morphologically identical with Masson's tumour of Leydig cells in a testis and that the other (Giordano and Haymond) was composed of the same cells.

These peculiar cells I am alluding to were described and identified in 1923 (Berger) and had been occasionally reported upon before, but had been mistaken for phæochrome elements (von Winiwarter). They occupy the hilus of the ovary, where they form more or less large clusters, but may extend into the ovary itself and were proved to be cytologically identical with the testicular Leydig cells, of which a portion was also shown to extend outside of the

testis proper into the albuginea, the hilus and even along the deferential duct. In both sexes the extraglandular cells have always close relations with the sympathetic nerves, so that I felt justified in calling them "sympathicotropic cells". They have also been called since: "ovarian hilus cells", "extraglandular interstitial cells" or even "extraglandular Leydig cells", although Leydig never suspected their presence in the ovary.

A recently observed small adenoma of these cells in the ovary of a woman of 50 supplemented their morphological identity with the testicular Leydig cells by a functional one, for the tumour was accompanied by a facial hypertrichosis, which needed shaving twice or thrice a week; a male pubic escutcheon; a deep and hoarse voice with a slightly protruding larynx; large shoulders and a small and deep pelvis; atrophy of the breasts and a marked enlargement of the clitoris. Surprisingly enough the menstrual cycle remained normal, although menses were very painful and abundant. The masculinized state persisted for 18 years, when the patient showed signs of uterine fibromas and had her internal genitals removed. Soon after operation some of the masculine characters underwent a significant regression, most conspicuous in the diminishing growth of facial hair and mellowing of voice.

Another masculinizing tumour of the sympathicotropic cells was reported by Dreyfus and Barrozo do Amaral, but their case is somewhat obscured by the simultaneous presence of a rather vaguely described adrenal tumour.

Very recently, during routine examination of an ovary, which was removed together with the uterus for cancer of the cervix in a woman of 60, we were struck by an important hyperplasia of the sympathicotropic cells in the hilus. An inquiry made of the surgeon elicited the fact that the patient presented moderate, but obvious symptoms of virilism, with male facial and body hair growth and hypertrophy of the clitoris.

These observations prove that the masculinizing effects may also be due to a diffuse hyperplasia or adenoma of the sympathicotropic cells. It is highly probable that an eventual malignant growth of these cells will have the same result. No such instance has hitherto been reported, unless—as we suggested above—some very undifferentiated sarcoma-like arrhenoblastomas are indeed composed of indifferent sympathicotropic cells.

The sympathicotropic cells of the ovary being identical with the testicular Leydig cells, they must be considered as true heterosexual elements and the virilizing effect of their tumours is in entire accord with the work of Bouin and Ancel and their school, who have shown that the secondary male characters are prevailingly directed by the endocrine secretion of the Leydig cells, an opinion upon which most biologists actually agree. It seems worth while mentioning, that these heterosexual elements are located in the very region, which corresponds to the embryonic medulla and to which a male potency is ascribed.

One point concerning the tissue relations of the sympathicotropic cells remains in suspense: it is their regular and close connection with nerves. One cannot fail to be impressed by this neuro-endocrine association, which reminds one of that existing between the nervous and endocrine portions of the hypophysis and adrenals and in the pancreatic neuroinsular complexes of Van Campenhout and Simard and which, thus, raises a problem of general endocrinology.

To the classical virilizing syndromes, the adreno-genital and those due to arrhenoblastoma and perhaps luteoma, must, therefore, be added another, which is due to hyperplasia or tumour of the sympathicotropic cells, the presence of which show, that even in the normal human ovary some tangible vestiges of the initial ambisexual organization ultimately persist.

BIBLIOGRAPHY

1. ALLEN, E., DANFORTH, C. H. AND DOISY, E. A.: Sex and Internal Secretion. A Survey of Recent Research, Baltimore, 1939.
2. BENOIT, J.: Transformation expérimentale du sexe par ovariotomie précoce chez la poule domestique, *C. R. Acad. d. Sciences*, Paris, 177: 1074, 1923.
3. BERGER, L.: La glande sympathicotrope du hile de l'ovaire: ses homologies avec la glande interstitielle du testicule. Les rapports nerveux des deux glandes, *Arch. d'Anat., d'Histol. et d'Embryol.*, 2: 255, 1923.
   Idem: Tumeur des cellules sympathicotropes de l'ovaire avec virilisation. Un nouveau syndrome anatomo-clinique, *Rev. Canad. de Biol.*, 1: 539, 1942.
4. BOUIN, P. ET ANCEL, P.: Recherches sur les cellules interstitielles du testicule chez les mammifères, *Arch. Zool. Exp. et Gén.*, 1: 437, 1903.
5. CAULLERY, M.: Les Problèmes de la Sexualité, E. Flammarion, Paris, 1920.
6. COSACESCO, A. *et al.*: Lutéinome de l'ovaire. Contribution anatomio-clinique à l'étude du virilisme ovarien, *Presse Méd.*, Paris, 2e sém., 1264, 1931.
7. CREW, F. A. E.: Studies in intersexuality. II. Sex reversal in the fowl, *Proc. Royal Soc. London*, 95: 256, 1923.
8. GALLAGHER, T. F. *et al.*: The daily urinary excretion of œstrogenic and androgenic substances by normal men and women, *J. Clin. Invest.*, 16: 695, 1937.
9. GERSH, I. AND GROLLMAN, A.: The nature of the x-zone of the adrenal gland of the mouse, *Anat. Rec.*, 75: 131, 1939.
10. GIORDANO, A. S. AND HAYMOND, J. L.: Luteinized granulosa cell tumour of ovary (luteoma), *Am. J. Clin. Path.*, 14: 28, 1944.
11. GOLDSCHMIDT, R.: Die sexuellen Zwischenstufen, Berlin, 1931.
12. GROLLMAN, A.: Essentials of Endocrinology, Lippincott, Phila., 1941.
13. GUYENOT, E.: L'Hérédité, O. Doin, Paris, 1924.
14. HILL, R. T.: Ovaries secrete male hormones, *Endocrinology*, 21: 495 and 633, 1937.

15. HOFFMAN, J.: Female Endocrinology, Saunders, Phila., 1944.
16. JORDAN, H. E. AND KINDRED, J. E.: Textbook of Embryology, Appleton-Century, New York, 1942.
17. NOVAK, E.: Gynæcological and Obstetrical Pathology, Saunders, Phila., 1940.
18. VON WINIWARTER: Contribution à l'étude de l'ovaire humain, *Arch. de Biol.*, 25: 683, 1910.
19. WOMACK, E. B. AND KOCH, F. C.: The testicular hormone content of human urine, *Endocrinology*, 16: 237, 1932.

RÉSUMÉ

Il est probable que les observations et les résultats rapportés chez certains animaux à propos de la réversibilité des sexes peuvent s'appliquer, du moins dans leurs processus fondamentaux, à la plupart d'entre eux, sinon à l'homme. L'ambisexualité est une caractéristique retrouvée chez tout être vivant. Pour ce qui a trait au virilisme humain, on s'accorde à attribuer cette anomalie à des facteurs endocriniens, et dans la plupart des cas le substratum anatomique consiste en hyperplasie ou tumeurs, souvent associées à une hypersécrétion ou à une dysharmonie fonctionnelle des endocrines. Les tumeurs masculinisantes habituellement rapportées sont les adénômes et carcinômes surrénaliens, les arrhénoblastômes et les lutéômes. Le problème des syndrômes génito-surrénaliens, partiellement expliqué par les facteurs histologiques et embryologiques a aussi une composante bio-chimique, notamment la sécrétion de substances androgéniques. Il faut encore intégrer dans les syndrômes caractérisés par le virilisme les cas de masculinisation qui sont sous le dépendance de l'hyperplasie ou de tumeurs des cellules sympathicotropes du hile de l'ovaire; ces cellules, identiques aux cellules testiculaires de Leydig apportent une nouvelle preuve de l'existence d'éléments hétérosexuels au niveau de l'ovaire humain.

JEAN SAUCIER

WAR WOUNDS: THE PRESENT STATUS OF THEIR TREATMENT*

The Address in Surgery before the Royal College of Physicians and Surgeons of Canada

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Consulting Surgeon to Director General of Medical Services

WE are now in the sixth year of the war and the Canadian Army, after a period of intensive training, has been in continuous and heavy fighting for fifteen months. From this experience, changes and improvements in our war surgery have evolved; some of fundamental and vast importance. War, as always, by its immense opportunities, and by the urgency and magnitude of the problems it presents, has provided the stimulus to the development of new and improved methods of treatment. This war has been more prolific than preceding wars in the advancement of surgical knowledge and skill.

The time is opportune for us to review the advances in surgery which are attributable to this war. The list is long. Chemotherapy by sulfonamides and penicillin; Trueta's closed plaster treatment of compound fractures; the treatment of shock by blood and blood substitutes; the development of blood transfusion services; the collection and processing of dried serum or plasma; the management of amputations; the management of chest wounds and of abdominal wounds; the treatment of burns; the rehabilitation of wounded soldiers by improved techniques in the field of physical medicine; these are but a few of the examples of surgical progress achieved during this war. Such a wealth of material precludes the possibility of reviewing it entirely within the time at our disposal. It must serve our purpose if we present one conspicuous example of the advances which have been achieved.

WAR WOUNDS AND THEIR TREATMENT

Nothing is more characteristic of war than wounds, and nothing epitomizes the whole problem of war surgery so well as does the management of war wounds. The skill with which we handle the wounds of war to a large degree is a measure of the success of our war surgery. This has been so in all the wars of history and it is equally true in this war. Moreover, the advances in the management of war wounds in this war have been so great and so important that a survey of war wound treatment becomes an important index of the progress of our surgical efforts.

War wounds present many surgical problems of great magnitude; (1) the primary damage to the tissue, though it varies with the type of projectile, in general is great, far in excess of the trauma seen in civil life. This excessive trauma accentuates factors, such as necrosis of soft tissues, which are of minor importance in civil surgery but which in war surgery dominate the field. In effect we find ourselves dealing with new surgical problems and we must completely revise our plan of treatment; (2) contamination is the invariable accompaniment of war wounds, and infection of varying degrees of intensity with varying types of bacteria will dominate the picture unless vigorous treatment is used early; (3) the syndrome of hæmorrhage plus shock is superimposed upon the picture of local damage plus infection; (4) accessory factors such as length of time which elapses before treatment is instituted, distance

* Delivered at the fifteenth Annual Meeting, Ottawa, October 28, 1944.

transported, fatigue, and the state of nutrition profoundly influence the outcome; (5) wounds of particular organs or parts of the body (*e.g.* chest, abdomen and large vessels of the extremities) introduce special problems. It is not hard to appreciate that much of our difficulty in devising improvements in wound treatment and in assessing the merits of new treatment is the result of the number and complexity of the problems involved.

FACTORS IN THE MANAGEMENT OF WAR WOUNDS

	Local factors	
	Severe trauma resulting in extensive tissue necrosis.	
Accessory factors		*Systemic factors*
Time at which treatment is instituted.	Contamination (dirt, clothing, foreign body, bacteria).	Hæmorrhage plus shock.
Fixation of the soft tissues as well as the broken bones.	Established infection.	Accentuated by fatigue, dehydration, starvation, long and rough transport.

THE GREAT CENTRAL PROBLEM

INFECTION IMPLANTED IN GROSSLY DAMAGED TISSUE

The great central problem which is distinctive of war wounds is infection. There are many other problems, some of them important and serious, but they are accessory to the central problem of infection. Extensive damage to soft tissues and gross contamination of the wound invites the establishment of infection and renders difficult its control by the normal defense mechanisms of the body. Compared with the wounds of civil life, the extent and severity of the infection in war wounds is so overwhelming as to constitute the urgent and distinctive feature.

CONTRIBUTION OF THE LAST WAR TO WOUND TREATMENT

The great contribution of the last war to wound treatment was the demonstration that debridement and Carrel-Dakin irrigation enormously reduced the problem of infection and saved many lives. Time has proved that the factual basis for this treatment is sound. Bacteria implanted in the necrotic soft tissue multiply there uninfluenced by leucocytes or body fluids, and so establish themselves as to constitute a grave menace to life or to the extremity. The early removal of the damaged soft tissue, leaving the wound lined only with healthy living tissue permits the normal defense mechanisms of the body to deal more effectively with such contaminating bacteria as remain implanted in the wound. Dakin's solution kills bacteria without seriously damaging tissue, and in addition has the property of dissolving necrotic tissue (chemical debridement). The improvement in the clinical condition of wounds so treated and the reduction in the mortality was marked.

At the time, accurate assessment of the merits of debridement plus Carrel-Dakin irrigation was rendered difficult by many factors. The exigencies of war surgery and the pressure of work prevented a uniformly high standard of debridement. The Carrel-Dakin irrigation technique was difficult and time-consuming. It could not be conducted satisfactorily without a large and specially trained staff. Secondary contamination of the wound by air-borne mouth organisms was poorly understood. The whole picture was confused by the multiplicity and complexity of the problems surrounding the management of gross infection in badly shattered wounds. For the most part, attention was directed to the use of antiseptics (the cry was "back to Lister"). Even Carrel, though he recommended the preliminary mechanical cleansing of the wound and recognized the value of Dakin's solution in dissolving necrotic tissue, still stressed as the outstanding merit of his method the antiseptic power of Dakin's solution and its ability to kill bacteria without destroying living tissue.

The war ended before the technique of debridement had reached its final perfection and before the results were indisputably clear. Indeed it would not be unfair to say that the principles of debridement and dakinization of wounds were but poorly understood in spite of the success they had achieved. In the period between the wars, the method made slow progress. This was due partly to lack of any considerable number of cases presenting the problems peculiar to war surgery (extensive shattering wounds, gross contamination with dirt, clothing and bacteria, delay in establishing treatment). Nonetheless, the method was not abandoned. Industrial and road accidents did provide cases which bore some resemblance to war injuries. For these it was universally agreed that debridement was an essential step

in the treatment. At least one industrial surgeon, Wm. O'Neill Sherman, has retained to this day the full ritual of mechanical cleansing plus Carrel-Dakin irrigation for compound fractures. Skill and improved technique in dealing with compound fractures demonstrated that early operation and careful debridement permitted the infection to be controlled without the use of irrigation with Dakin's solution. The tedious ritual of its use, the necessity for the daily testing of the solution, the time and effort necessary for the successful use of the method on the ward and the bulkiness of the solution and its cost when bought from commercial firms were objections which slowly led to its disuse in spite of its undoubted merits as an antiseptic.

CONTRIBUTION TO WOUND TREATMENT OF THE PERIOD BETWEEN THE WARS

During the period between the wars, some important contributions to wound treatment were made. Of these the *first* was *the control of infection due to hæmolytic streptococci.* Investigations which began during the last war, demonstrated that hæmolytic streptococci were secondary contaminants which always came from the nose and throat, either directly or through the intermediary of contaminated clothing, dressings, bedding, hands or instruments. It took much time to prove this fact and still greater time to appreciate its importance and significance and to apply it to the treatment of wounds, especially compound fractures. It meant in effect that if wounds were protected by an appropriate dressing or better still by early closure of the skin, the danger of implantation of streptococci was eliminated. Part of the merit of Winnett Orr's closed plaster treatment resulted from the exclusion of secondary infection, a point which Orr constantly stressed.

Second in importance was *the introduction of sulfonamides* (1936). At first their great value was in the treatment of respiratory infections but the introduction of sulfanilamide and later of sulfathiazole began their use in infected wounds. By the time this war broke out, their value in the control of wound infection was still under judgment but experience was rapidly accumulating to demonstrate that their influence upon infection was profound. The training stages of the war left no doubt as to the beneficial effect of this initial form of chemotherapy for wound infection.

Improvement in technique and *earlier operation* plus the use of sulfonamides and the exclusion of streptococcic infections permitted such improvement in results that the trend of treatment of compound fractures was so to deal with the wound at the initial operation as to permit its primary closure and thus convert the compound fracture into a closed fracture.

The Spanish Civil War produced a *third* major contribution to the treatment of war wounds. *Trueta's closed plaster technique* was the application to war fractures of the method which Winnett Orr had been advocating for the treatment of osteomyelitis. Trueta's earliest publication indicated an amazing reduction in mortality (6 deaths in 1,150 compound fractures). It is stated by the Russians that the closed plaster treatment is not new; that it was used by Pirogoff during the Crimean War, and ample documentary evidence is advanced to support this claim. But credit must be given to Trueta for independent discovery of the principle by following a different path of reasoning and experience, and for presenting it to the international world of surgery as a valuable form of treatment. Pirogoff's statement of the merits of the closed plaster treatment did not sufficiently impress Russian surgery to influence their treatment of compound fractures in the war of 1914-1918.

Trueta's contribution to the treatment of war wounds is of the greatest importance. There was, however, an element of chance and of good fortune in its introduction. Trueta had been using Winnett Orr's closed plaster treatment for osteomyelitis. It was natural that he should continue to use it in compound war fractures since osteomyelitis all too often is an outstanding problem in them. It was a convenient form of treatment since it permitted the maximum number of cases to be treated in a given time with the minimum of assistance and equipment. The plaster fixation facilitated early evacuation. It was, moreover, fortunate that Trueta's casualties were mostly the result of urban bombing, and hence were operated upon with the minimum lapse of time after wounding. This ensured the best results from the debridement.

But at the beginning of this war the closed plaster treatment was poorly understood; the

principles underlying the method were not defined, the results were unverified; its shortcomings were decried and much emphasis was placed upon the malodorous pus which saturated the plaster. Nevertheless, Trueta's results in terms of low mortality, low incidence of gas gangrene and of amputation were impressive, and the possibility that this might be a new and valuable method of treating war wounds was recognized. In the pungent phrase of Rudolph Matas, "Not all cheese that smells bad is bad".

WORLD WAR II.

At the outbreak of the present war, the situation with respect to the treatment of war wounds was as follows. Early debridement was accepted as a standard principle of wound treatment though Carrel-Dakin irrigation had been largely abandoned. The importance of

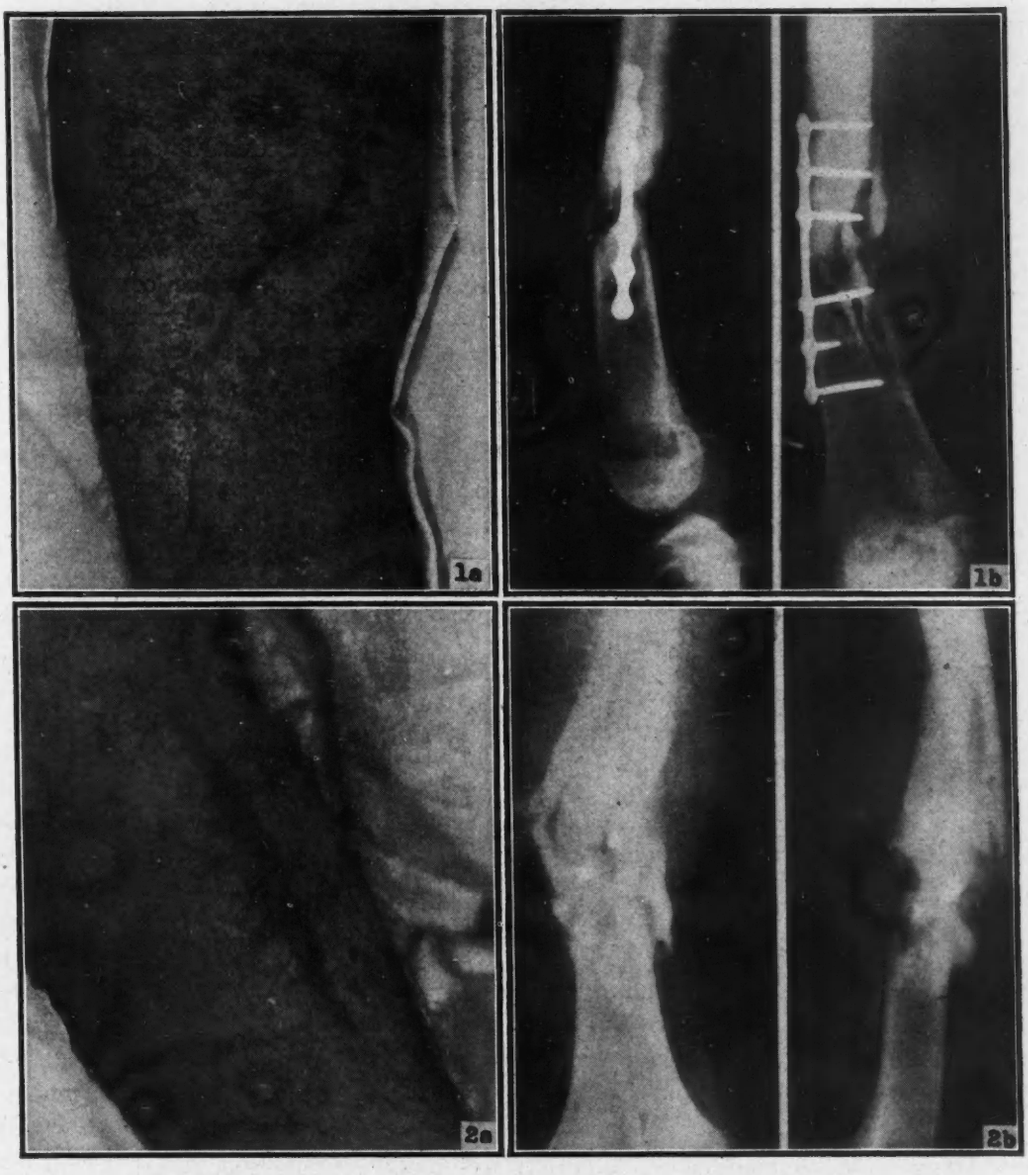

Fig. 1.—Compound fracture from H.E. shell fragment May 30, 1944, at Anzio. Primary surgery (debridement) on the beach. Penicillin started on day of wounding. Evacuated to Naples where, eight days after wounding, the fracture was plated and the wound closed. There was primary healing. These pictures, taken at Joint Services Special Treatment Centre, Orthopædic, Christie Street Hospital, show his condition August 30, 1944, three months after wounding. (1a) The well healed wound of the thigh. (1b) The plated fracture. Since that date, the plate has been removed and the ununited fracture treated by bone-grafting with primary healing of the operative wound.

Fig. 2.—Compound fracture of femur from H.E. shell fragment June 11, in Normandy. Debridement and fixation in Thomas splint on the day of wounding. Penicillin commenced and continued to July 6. On July 1, secondary closure of wound which healed by primary union. Sutures removed July 12. These pictures taken at Joint Services Special Treatment Centre, Orthopædic, Christie Street Hospital.

air-borne contamination by streptococci was beginning to be understood. Sulfonamides were available for the control of infection by organisms susceptible to these drugs. Trueta had published his first small monograph on the merits of the closed plaster method of handling compound fractures. The results were so striking as to attract the attention of all who had to deal with war fractures.

During the years of strenuous training through which the Canadian Army passed in England, ample opportunity occurred to submit to trial various methods of treatment. The rigour of training, the accidents of the blackout, the dangers of motorcycling and the gunshot wounds of various types sustained in training provided a long stream of wounds, many of which were compound fractures. In the treatment of these there was perfected a technique which first was submitted to the test of war at Dieppe.

During this period also Trueta was engaged upon his researches on wound healing at Oxford by means of which he defined the principles of the closed plaster method of treatment, enlarged its scope, improved the technique and overcame certain shortcomings (notably the handling of the fractured bone). By a series of ingenious experiments, he was able to demonstrate that if an adequate debridement of the wound had been performed and drainage provided, the closed plaster had two important merits: (1) it excluded secondary infection from the wound and (2) by splinting the soft tissues it greatly enhanced the development of local defense barriers. Of these two merits the latter was of even greater value than the former. It was John Hilton's old therapeutic principle of rest come to light again in a new and important guise.

The plan of management of war wounds which evolved from this Canadian experience is well exemplified by the procedure for the care of compound fractures, the steps of which were as follows:

1. Operation must be undertaken as quickly as possible after injury. This is of great importance.

2. An adequate debridement must be performed. This is the most important single step in the treatment. The wound is enlarged by longitudinal incisions which provide adequate exposure and relieve tension. All devitalized tissue is removed and all foreign material and blood clots removed. Perfect hæmostasis is secured.

3. Drainage must be provided by leaving the wound unsutured and by inserting into the depths strips of plain or vaseline gauze.

4. The fracture is reduced by manipulation. Transfixing Steinman pins or Kirschner wires are inserted if necessary for traction or stability.

5. A plaster is applied, usually unpadded except for bony points. It completely covers the wound and its dressing.

6. Sulfonamides are administered, sometimes locally during the debridement but more often by mouth.

7. The plaster must be changed only at long intervals.

The results obtained by this plan of treatment of compound fractures were amazingly good and especially so in the control of infection. When one considers the severity of the trauma, and the magnitude of the damage caused by it, the freedom from any serious amount of infection was remarkable. Of the various steps in the plan of treatment, the most essential were (1) early operation; (2) adequate debridement; (3) drainage plus the relief of tension; (4) closed plaster fixation. If these could be accomplished, the remaining steps were refinements, or were concerned with other problems than the control of infection (*e.g.*, the management of the fracture).

FIELD SURGICAL UNITS

To apply the principle of *early operation* to war wounds in the field necessitated the development of a new kind of medical unit called F.S.U. (Field Surgical Unit). The desert campaign of Libya and Tunisia, where movement was rapid and distances great, gave birth to it. It solved the problem of providing early surgery by bringing the surgeon and his equipment to the wounded soldier rather than trying to take the soldier to the surgeon. A considerable portion of our success in this war's surgery has been due to the functioning of Field Surgical Units. They consist of a surgeon and an anæsthetist, two operating room orderlies, three transport drivers, with two trucks and a station wagon which contain all the equipment necessary to perform about fifty operations. Highly mobile, capable of rapid packing and unpacking, and rapid movement, they can be pushed as far forward as safety will permit. Two of them and a

Field Transfusion Unit, associated with any forward medical unit which has beds and nursing services (Field Dressing Station, Field Ambulance) constitute a team capable of handling a large number of seriously wounded patients at the very earliest moment after wounding. Since the surgery must often be performed under primitive conditions, equipment, instruments and technique must be reduced to streamlined simplicity. Their great accomplishment has been to ensure that the life-saving operation of debridement can be carried out at a time before infection is established. Combined with their sister units, they have formed a compact, mobile, highly efficient life-saving team.

Fig. 3.—An extensive soft tissue wound which has resulted in loss of a great part of the soft tissue on the inner and posterior aspect of the thigh. Primary debridement followed by secondary suture under the protection of penicillin resulted in primary healing.

PENICILLIN

By the time the Canadians went into action in Sicily sufficient penicillin was available to make possible its use on an experimental basis. The work of Florey and Cairns in this campaign, upon the use of penicillin in the treatment of war wounds, is one of the great historic documents of war surgery. It marks the beginning of a new era of treatment. Forged in the white heat of a desperate urgency, it demonstrated that in penicillin surgeons had a new and almost magic aide to their handicraft. It did not displace surgery but supplemented it. The carefully hoarded small store of the drug available necessitated its use as a local application in the wound, a method which has been shown since to have shortcomings. But despite shortcomings and deficiencies it was clear that infection could be controlled when wounds were debrided adequately and early, and then treated by sulfonamides and penicillin.

SICILIAN AND ITALIAN CAMPAIGNS

The Sicilian and Italian campaigns demonstrated that early debridement, open wound drainage by vaseline strips, closed plaster encasements and the use of sulfonamides and penicillin effectively mastered the problem of infection in the great bulk of cases. Certain of the more serious injuries such as shattering wounds of joints were not as successfully handled and gas bacillus infection remained unaffected. Later, as larger quantities of penicillin became available, the efficiency of treatment was increased. But full benefit of the success of penicillin in mastering infection was somewhat marred by the length of time necessary for the wound to heal by granulation. The many changes of pus-soaked plaster, the odour (though this often was not so bad), the fibrosis which developed in the wound from organization of granulation tissue, the stiffness of the joints from long encasement in plaster and from fibrosis of muscles, left much room for improvement in the functional end result. Earlier healing of the wound obviously would do much to overcome these difficulties and with infection so easily controlled by penicillin secondary suture of the wound was a possible means of securing early wound healing. In the penicillin experiment of Florey and Cairns secondary suture was tried first with soft tissue wounds, then as confidence increased with more complex problems, such as compound fractures. For the first time in the history of modern war early healing of war wounds became a safe and accomplished fact.

NORMANDY

The climax of this slow evolution in wound treatment came with the invasion of France. By then sufficient time had elapsed to permit clear appreciation of the fundamentals of

the problem, and sufficient experience had been gained to determine the best form of treatment. It has been necessary to depict somewhat tediously the background which preceded our present plan of wound treatment in order that its success may be fully appreciated and its development understood. It can at least be said of the four and one-half long years of training of the Canadian Army that it provided time and opportunity to develop a technique of wound treatment which has been successful beyond the hope of the most optimistic. Penicillin opens new and startling possibilities in wound management.

In the eleven months which elapsed between the opening of the Sicilian campaign and the opening of the Normandy campaign, the supply of penicillin had increased enormously and stores were in hand sufficiently large to permit its use in virtually every case of injury. For the Normandy casualties, the essential features of the management of war wounds were; early surgery accomplished by pushing Field Surgical Units as far forward as possible; adequate debridement; relief of tension by longitudinal incision of fascia; drainage by vaseline strips; fixation in plaster or Tobruk splint, early and continued administration of penicillin and sulfonamides. Five days to two weeks later, in England, the plaster and dressings were removed, the wound wiped clean and a secondary suture performed under the protection of penicillin.

It is now possible to begin to assess the amazing success which has been achieved by this plan of treatment. It is necessary first to indicate that wounds vary in their severity and consequently in the magnitude of the problem they present. Soft tissue wounds which involve only the skin, subcutaneous tissue and fascia, can be closed by secondary suture, usually without the aid of chemotherapy or penicillin. Larger and deeper wounds of soft tissue involving muscle are sutured after a preliminary course of penicillin.

Compound fractures present a more complex problem, as do also wounds involving joints. It is in these that the most spectacular success has been achieved. Fractured femurs, for instance, are treated in the field by early and adequate debridement, fixation in a Tobruk splint, and the establishment of sulfonamide and penicillin therapy (120,000 units per 24 hours). They reach England within a few days of wounding. There a day or two is spent to give the soldier a much needed rest, to administer blood and plasma where needed, to ensure that sulfonamide and penicillin administration is satisfactory and to secure an x-ray of the fracture. Five to fifteen days from wounding, the plaster is removed, the wound cleansed, the fracture is reduced (usually by skeletal traction, but occasionally by open reduction and fixation) and the wound is sutured. Plaster is then applied, incorporating a Steinman pin for traction. About 80% of all wounds are submitted to secondary suture and of these 80% heal *per primam* or with an insignificant amount of reaction about the sutures. To the surgeon whose memory of compound fractures is based upon the experiences of the last war, it is a startling evidence of the progress we have made to find convoys of wounded reaching Canada as early as a month after being wounded in France, their wounds soundly healed, their fractures advanced in union, and with no sign of sepsis. Florey's comment that "penicillin offers new and startling possibilities in wound management" has been amply borne out.

Some conception of the importance of this revolution in wound treatment may be appreciated from excerpts from letters received from my surgical colleagues who are engaged in this work.

"We have done some most interesting cases, the results of which we shall await with great interest. We receive the casualties, mostly extremity wounds, three to four days after their injury and most of them in excellent condition. They are all on sulfonamides and many on penicillin which has been kept up very well during evacuation. As a result we see nasty compound fractures and joints and huge flesh wounds which have been most adequately debrided, whose wounds are comfortable in plaster and who are showing little or no constitutional reaction or infection. Today we closed a compound comminuted humerus with through and through wounds and great muscle destruction, leaving in penicillin tubes. We did a compound comminuted femur with great shattering of bone; wired the ends of the bone and after debriding everything carefully the second time closed up the two sides of the through and through wound tightly and put on a plaster of Paris spica. The result from the point of view of wound healing and of postoperative course is nothing short of miraculous; no fever, no reaction, no discomfort, no tenderness over the large secondary sutures of soft tissue.

"In compound fractures the aim is to close them all. The optimum period is between five to ten days."

Col. Churchill, consulting surgeon to the American Army in Italy, in his recent paper on War Surgery (*Annals of Surgery*, September,

1944) states "of 25,000 cases sutured under the protection of penicillin 95% healed by primary union or nearly so with no loss of life or limbs".

It is not possible yet to assess accurately the influence of this improved plan of treatment upon the incidence and course of gas gangrene, but there is good reason to think that it has been profoundly improved. From D-day until the end of July, 20,000 casualties passed through Canadian hospitals in England. It is estimated that amongst these there were not more than twenty cases of gas gangrene. If these figures are correct, the incidence would be 0.1%, which is just 1/20 the incidence amongst the casualties of Dieppe and of Sicily. Even after allowance has been made for unrecorded cases in France, it seems probable that this means a new low for this dread infection of war.

It must be recorded that of the secondary sutures which are performed on compound fractures in England and which heal so spectacularly, a certain proportion subsequently break down and form a sinus. How great is this group it is not yet possible to say. It is an impression that it may reach 15%. Such sinus formation must be accepted as inevitable. It would be too much to expect that all such compound fractures when sutured will heal, and never again give trouble. In some there will be fragments of dead bone which harbour infection. But it must also be recorded that such sinus formation, when it does occur, is of little seriousness. It develops quietly, there is no fulminating spreading infection, and cure by removal of small sequestra is not difficult. It would be incorrect to leave the impression that these recurrences detract materially from the importance of what has been accomplished by secondary suture of war wounds under the protection of penicillin. In spite of a proportion of cases which develop late sinus formation the net result is still a vast improvement over anything which has yet been accomplished in war surgery. The cleanly healed wounds with flexible soft tissues, lack of dense scar and mobile joints which result from this plan of treatment, lead to greatly diminished permanent disability.

One of the most important consequences of the present method of wound treatment is our ability to undertake reconstructive surgery upon bones at an early stage and with safety. Bone graft for non-union can be performed within a few months of injury, sometimes within a few weeks. Under the protection of penicillin bone grafting can be performed successfully even in the presence of granulation tissue, sequestra or (sometimes) sinuses. The reconstructive surgery of war injuries is being transformed by new procedures made possible by the early closure of war wounds.

There are those who are beginning to state that success with primary suture can be achieved without penicillin or sulfonamides providing the primary surgery is properly conducted. The value of penicillin they state is that it has opened our minds to the possibility of secondary suture of war wounds. It is certain that penicillin or no penicillin nothing will succeed unless the primary surgery has been early and adequate, and what can be accomplished when primary surgery has been so performed is much greater than the most optimistic ever dared imagine. Yet it is difficult to believe that as good results can be achieved without penicillin as with it. Debridement, no matter how early or how carefully performed cannot always remove every bacterium. It seems reasonable that there will always be a place for the use of a powerful bacteriostatic agent, such as penicillin.

This paper has been limited to the basic principles of wounds, and nothing has been said of special types of war wounds (chest, abdomen, large vessels) which present very special problems. We have been concerned with fundamentals and time has not permitted us to wander beyond these.

In summary it may be said that we are witnessing a revolutionary advance in the treatment of war wounds. The ability to close 80% of wounds under the protection of penicillin, within two weeks of the wounding, and to have the great majority of these heal by primary union and remain healed, is little short of miraculous. The wards of our military hospitals in Canada and of our Special Treatment Centres are filled with scores of soldiers who two months ago were wounded in France. Today their wounds are healed and their fractures are far on the way to solid union.

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RÉSUMÉ

Dans toutes les guerres, le grand problême à résoudre a toujours été l'infection des plaies. Lors de la guerre de 1914-18, la méthode Carrel-Dakin a été la grande contribution de l'époque; puis, de 1918 à 1939, on a aussi fait quelques progrès importants: on a contrôlé l'infection secondaire causée par le streptocoque hémolytique, on a connu le procédé de W. Orr, on a mis au point un nouvel antiseptique: les sulfamidés, et on a consigné les résultats obtenus par le plâtre fermé de Trueta. A la deuxième grande guerre, on fait encore les débridement initial des plaies mais on n'irrigue plus au Dakin. Les sulfamidés ont singulièrement abaissé la mortalité initiale. En résumé, on opère aussitôt que possible, on débride et on incise, on draine et on applique le plâtre fermé. Après les campagnes de Sicile et d'Italie la pénicilline a encore ajouté à l'efficacité des traitements antérieurs. La gangrène gazeuse est devenue une rareté. Les traitements sont devenus très courts: 80% des blessures sont fermées après deux semaines.

JEAN SAUCIER

THE RÔLE OF THE X-RAY IN THE DIAGNOSIS OF POSTERIOR HERNIATION OF THE INTERVERTEBRAL DISC*

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IT is now known that the symptoms and signs produced by posterior herniation of the intervertebral disc are greatly diversified, and that while there is a so-called typical syndrome, this is by no means invariably present. Frequently there is an absence of objective clinical findings, and subjective complaints which may not necessarily be reliable are the only positive features. Multiple herniations in one individual are quite common. It seems evident, therefore, that an accurate method of diagnosis or exclusion of herniation of the intervertebral disc by radiological methods is essential. Now that oil myelography, with subsequent aspiration, is possible, there is good cause to believe that before surgery is undertaken this method of examination should be used in all individuals suspected of such herniations.

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Presented to the Section on Traumatic Injuries of the Nervous System, Subcommittee on Surgery, of the Associate Committee on Medical Research of the National Research Council and now made available for publication.

HISTORICAL

Comparatively little was known about this condition before the work of Mixter, Barr, Ayer, Hampton and Robinson[1, 2, 3] at the Massachusetts General Hospital, who, about ten years ago, described their procedure of injecting lipiodol into the subarachnoid space with subsequent roentgenological examination and operation. This was widely adopted in other parts of the world but many questioned the advisability of leaving 5 c.c. of lipiodol in place, knowing that it would not be absorbed, and suspecting that it might at times produce undesirable after-effects. Such reactions seem infrequent, but there is no universal agreement on this matter, so in an attempt to avoid complications, particularly in compensation cases, the use of gas as a medium to visualize the subarachnoid space was advocated.[4, 5] Thorotrast has been used by Nichols[6] who has described how to remove most of it afterwards, but this method has not been generally approved. In 1941 Kubic and Hampton[7] described a very simple way of aspirating lipiodol from the subarachnoid space at the conclusion of the examination. More recently a new radio-opaque oil, ethyl iodophenylundecylate, registered under the trade mark of pantopaque has been developed by the Department of Radiology, School of Medicine and Dentistry, the University of Rochester.[8, 9]

At the Montreal Neurological Institute and at the No. 1 Canadian Neurological Hospital various methods have been used to diagnose herniation of the intervertebral disc. Plain radiographs are often of no help. Lipiodol was used very sparingly until it was discovered how to aspirate it. Very occasionally, when there is a complete block of the subarachnoid space, the injection of ½ c.c. of opaque oil accurately localizes the lesion. Small quantities of oil, such as 2 c.c. have been found to be unreliable except when very large protrusions are present. Persistent attempts with oxygen were encouraging and many herniations were thus diagnosed. However, many such myelograms were indefinite, and they never excluded herniation. Since early in 1942 the injection of iodized oil, with subsequent aspiration, has become routine. During part of this period lipiodol has of necessity been the opaque medium, but pantopaque is much to be preferred, not only because it is much more easily injected and aspirated, but

also because it moves more freely. There is the additional advantage that any small amount which may be left in place is gradually spontaneously absorbed. While it is not as radio-opaque as lipiodol, it is sufficiently dense for practical purposes even in large individuals.

PRESENT METHOD OF EXAMINATION

Preliminary plain films, preferably stereoscopic antero-posterior and lateral and sometimes oblique views of the lumbosacral region, should not be omitted, and the antero-posterior views should include the hip joints. These examinations, whilst seldom diagnostic, may offer suggestive evidence of intervertebral disc herniation and they help to exclude other important lesions, such as spondylolisthesis, pre-spondylolisthesis, sacro-iliac arthritis, hip joint disease, malignancy, etc. Oil myelography is performed preoperatively on practically every patient in whom a herniated intervertebral disc is suspected. It is most important that this procedure should not be carried out until at least two weeks after a former lumbar puncture, for in the past, several weird deformities have been encountered which later proved to be due to traumatism or to leakage of subarachnoid fluid into the subdural space due to a previous diagnostic puncture.

The necessary x-ray apparatus is relatively simple but it must include a tilting table, preferably motor-driven and a spot film device. The personnel should consist of four individuals who are accustomed to working together. The roentgenologist is present during the entire procedure and wears red goggles except when fluoroscoping. The x-ray technician supervises setting the apparatus, and also delivers unexposed films and removes exposed films which he or she later processes. All radiograph exposures are made by the roentgenologist. A nurse should be in attendance to take charge of the sterile lumbar puncture tray and wait on the fourth very important member of the team, usually an intern, who is to perform the puncture, inject the oil and later aspirate it. He should be familiar with conventional lumbar puncture, so that he has acquired the "feel" of the procedure and can tell when he has punctured the dura. More important still he must be gentle and willing to work slowly, for one false move at the commencement may cause marked subsequent unnecessary delay and much discomfort to the patient. Certain operators never acquire this ability, but this is unusual if they are properly trained and if their errors are pointed out to them in a proper manner.

The patient is brought to the x-ray department and placed on the x-ray table in the prone position with a folded pillow under the abdomen to produce flexion of the lumbar spine. Preliminary sedation is omitted unless the symptoms are very acute. An 18 gauge lumbar puncture needle, with a flat bevel, is inserted between L 3 and L 4 after thorough infiltration with novocaine or nupercaine, the patient remaining prone. This is the level of choice but if puncture here is not possible, an attempt may be made between L 2 and L 3. Puncture between L 4 and L 5 or between L 5 and S 1 is usually undesirable as these are the two regions where herniations are most common.

The direction of the needle, as it is being inserted, is repeatedly checked by the roentgenologist and the nurse from positions at the ends of the table so that lateral deviation may be avoided, and until a mid-line puncture seems reasonably certain no attempt is made to pierce the dura. When it is felt that the point of the needle is at the proper depth, the stylet is withdrawn to see if spinal fluid escapes. If there is no flow the stylet is replaced and the needle is very cautiously inserted slightly deeper. This is repeated until the puncture is successful, every effort being made to avoid touching the anterior wall of the canal. If the patient complains of electric shocks or pain radiating down one leg, it usually indicates that the needle is directed to that side and it should be withdrawn so that it may be properly inserted. When in doubt fluoroscopic examination may help to decide the position of the needle point in relation to the spinal canal.

As soon as a satisfactory puncture has been obtained sufficient spinal fluid is collected for the usual biochemical tests. One-quarter of a cubic centimetre of opaque oil is then injected, the stylet reinserted, the needle covered with sterile gauze and the patient fluoroscoped to make certain that the oil has entered the subarachnoid space. If this is the case, it will move upward and downward as the table is tilted. This is a most necessary step as it has been repeatedly found that even though spinal

fluid drips freely, the injected oil may partly or wholly enter the subdural space and on occasions may enter the epidural space. In the event that *all* the oil is subarachnoid in location the remainder is injected. The total should be 5 to 6 c.c. This amount can be aspirated just as completely as 3 c.c. and the accuracy of diagnosis is greatly increased by the larger quantity. It is injected at room temperature and the syringe and needle are not warmed. They should be entirely dry, as apparently even a small droplet of water will cause a decidedly uncomfortable meningeal reaction the following day. If the patient complains of discomfort or if the needle be accidentally moved during the injection, fluoroscopy should again be used to make certain that the injection is proceeding satisfactorily. If on the other hand, the preliminary fluoroscopy indicates that the injection is unsatisfactory it is immediately discontinued and it is not repeated until the position of the needle is changed or puncture carried out at another level.

When all the oil has been injected, the needle is covered with gauze which is strapped on by adhesive, and the pillow is pulled down about six or eight inches so that it is under the pelvis. The patient's head is lowered by tilting the table with the head end down, and under the fluoroscope the oil can be watched as it flows cephalically as high as the domes of the diaphragm. If any deformity is encountered in the upper lumbar or lower thoracic regions, spot films are made, but if the column of oil is not deformed, the head of the table is raised and the pillow removed. As soon as all the oil has descended to the lumbosacral region the examination is continued. First the patient is placed almost erect and then the head is gradually lowered so that at the last it is well below the feet. The movement of the oil is watched under the fluoroscope and five or six spot films are made, whether or not any definite abnormality is noted. The same process is then repeated with the patient rotated 30 to 45 degrees to one side and subsequently the same amount to the other side. Four to six spot films are made in this latter portion of the examination. An attempt is made to diagnose the presence or absence of herniation from the fluoroscopic examination and frequently this is possible. Sometimes minor deformities are not readily seen under the fluoroscope, particularly in heavy individuals and it is not advisable to prolong fluoroscopy unduly in questionable cases when adequate spot films can be made and subsequently studied at leisure. A final diagnosis is never expressed until the films have been carefully examined and correlated with the fluoroscopic findings.

When the examiner is satisfied that the subarachnoid space has been explored thoroughly, the table is tilted so that the bulk of the oil is opposite the point of the lumbar puncture needle which is still in place. This usually occurs when the head of the table is slightly higher than the feet, but there is considerable individual variation and the correct position can only be established under the fluoroscope. If inadvertently the puncture has been made between L 2 and L 3, it is usually necessary to have the head lower than the feet and it is sometimes necessary to re-insert a pillow under the pelvis so that the oil will run upward sufficiently high. Aspiration is then commenced and usually about 2/3 of the oil can be removed before spinal fluid is obtained. Occasionally, if the subarachnoid space is large, it may be necessary to insert the needle slightly deeper, as the oil collects in the anterior part of the space.

When spinal fluid appears in the syringe, aspiration is discontinued, the stylet reinserted and the patient fluoroscoped. The table is again tilted so that the remaining oil is opposite the needle and the aspiration continued. It is usually necessary to repeat these manipulations several times until the removal is reasonably complete, only a drop or so remaining. If the oil becomes broken up it is often helpful to elevate the head of the table considerably so that it collects in the sacral region in one mass and then it is run up again to the needle point. Sometimes the oil will not puddle well opposite the point of the needle, particularly when part of it has been withdrawn. In such instances it is advisable to position the patient so that the upper pole of the oil is at, or near, the bevel of the needle, which should be directed caudally, and then proceed to aspirate, meanwhile lowering the head of the table so that the oil is sucked out as it is passing the needle point. This procedure sometimes repeated several times will often greatly facilitate complete aspiration in cases in which

it would otherwise be difficult or impossible. At the conclusion a spot film is always made to record the completeness of the aspiration.

The size of the subarachnoid space differs tremendously in different individuals. Not infrequently it is very wide and if this is the case considerable leeway is permissible in the position of the point of the lumbar puncture needle to either side of the midline. A midline puncture is essential when the subarachnoid space is very narrow, and even with a perfect puncture aspiration may be difficult due to the small space between the nerves of the cauda equina. Too much negative pressure should never be used in aspiration and if pain results it indicates that a nerve root has been sucked against the bevel of the needle. Almost invariably this makes further aspiration impossible until the situation is rectified. Sometimes this can be accomplished by altering the depth of the needle, particularly by inserting it a little *deeper,* but as previously mentioned care is taken not to touch the anterior wall of the canal until practically all the oil has been withdrawn, for this is apt to produce a hæmatoma which prevents satisfactory puddling. Reinsertion of the stylet and gentle withdrawal will often push aside a nerve root at least temporarily, and altering the position of the bevel by rotating the needle often helps. When there is oil around the tip of the needle there is much less likely to be radiating pain, as this seems to form a protective film which prevents the root from adhering to the needle.

If the needle is somewhat to one side of the midline, rotating the patient slightly to elevate the opposite side of the body often helps, as it allows the oil to flow over into that side of the canal. When there is serious difficulty in aspiration, it is advisable to repuncture at another interspace and usually the aspiration is then speedily and easily accomplished. At this stage the examination has been completed and it is permissible to use the interspace between L 4 and L 5 or between L 5 and S 1, for by now any serious narrowing of the subarachnoid space at either of these two levels will be known and avoided.

The above technique applies to examination of the lower thoracic, lumbar and sacral portions of the subarachnoid space. If the suspected lesion is thought to be situated in the cervical or upper thoracic regions slight modification may be necessary. When pantopaque is used it is often possible to make it pass up into the neck by lowering the head of the table as much as possible, which is about 12 to 15 degrees, provided that there is a folded pillow under the abdomen, but sometimes a second pillow must be inserted. If there is a prominent posterior curvature of the thoracic spine, and more angulation is required the patient is rotated around on the table, the position of the head and feet being reversed. Leather boots without soles, but fitted with straps which are attached to the end of the table, are then laced in position around the feet and ankles. Once this is done the head can be lowered as much as desired and the oil made to pass upward to any level. When it approaches the cervical region the neck is fully extended to prevent it entering the skull. Once the oil has passed over the thoracic hump and reached the cervical region the patient should be rotated back to the original position as comparatively little lowering of the head is necessary from this point on.

It is quite unnecessary to keep the oil in one mass as it passes through the thoracic portion of the subarachnoid space, in spite of published statements to the contrary, and there is no objection to it entering the cervical region in large drops, for particularly when pantopaque is used these will later agglomerate. However, it is most important to use at least 5 or 6 c.c. of oil, for with a lesser quantity the canal is not properly visualized and the results are unreliable. By raising and lowering the table the entire cervical region can be examined both by fluoroscopy and by spot films, prone and oblique. Toward the end of the examination the head of the table is gradually elevated still further, first for examination of the upper thoracic region, and later to make all the oil run back into the lumbar region. Aspiration is carried out in the usual manner.

ROENTGENOGRAPHIC FINDINGS

A. LOWER THORACIC, LUMBAR AND LUMBOSACRAL HERNIATIONS

Plain radiographs.—Scoliosis is very common and this is often convex to the involved side, although frequently the reverse is true. Absence of the usual anterior curve in the lumbar region may also be noted and there may even be a slight posterior curve. The intervertebral

disc between L 5 and S 1 may be narrower than the remaining intervertebral discs, but the same holds true in individuals who are symptom-free and this finding does not necessarily warrant any conclusions. However, if the narrowing is very striking and there is sclerosis of the adjacent portions of the vertebræ, herniation of this disc, probably of long duration, may well be present. On the other hand, definite narrowing of the intervertebral disc between L 4 and L 5 is extremely suggestive of posterior herniation of this disc. In old herniations there may be sclerosis of the adjacent margins of the bodies of these vertebræ and perhaps localized hypertrophic bony changes (Fig. 1). Narrowed intervertebral discs above this level are rather uncommon.

Partial obliteration of the sacro-iliac joints with sclerosis is sometimes seen, and when marked may be responsible for sciatica re-

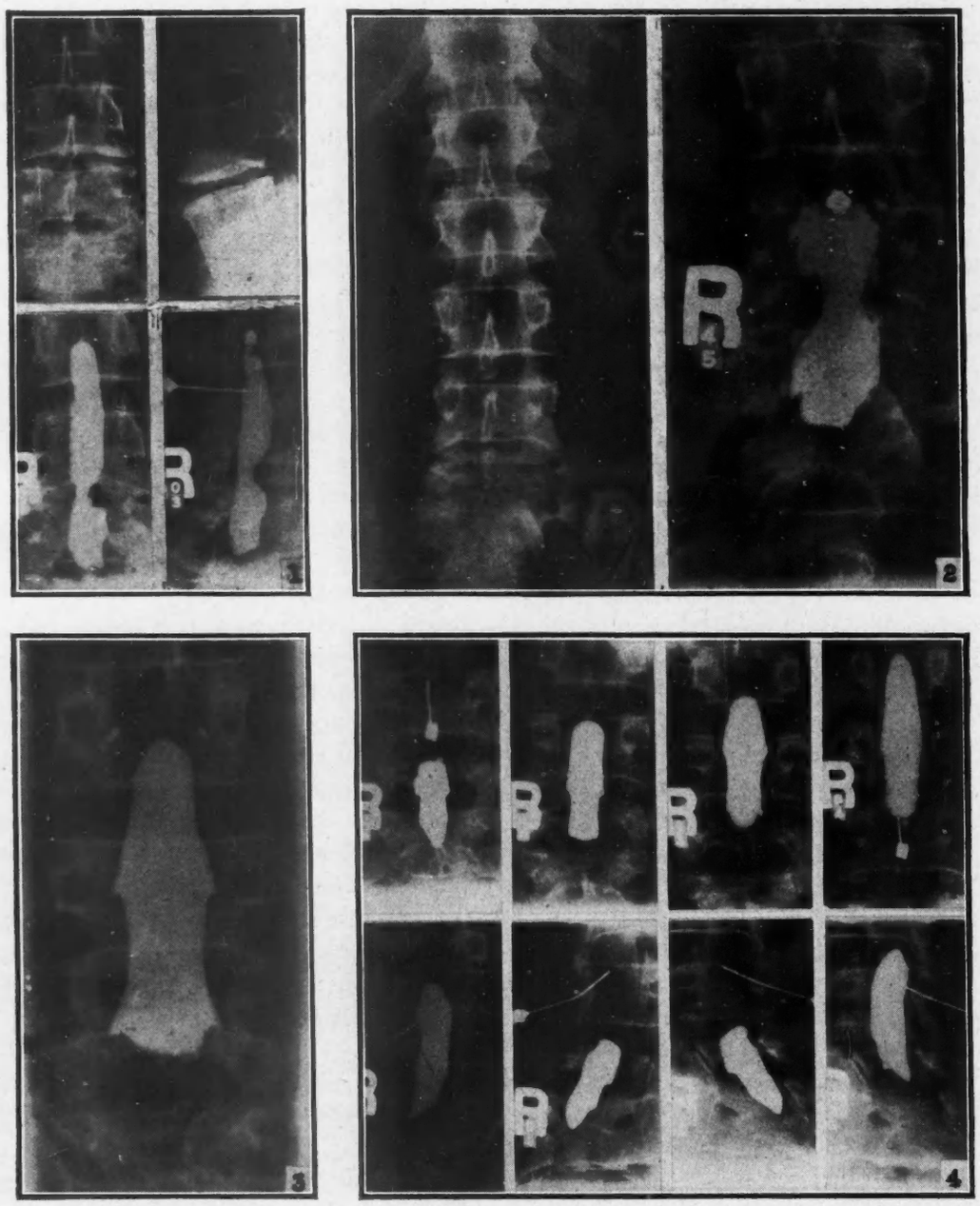


Fig. 1.—Narrowed intervertebral disc between L 4 and L 5 with posterior herniation of this disc on the left side. **Fig. 2.**—Sacralization of the left transverse process of L 5 with posterior herniation of the intervertebral disc between L 4 and L 5 on the right side. **Fig. 3.**—Normal myelogram. Note the regularly placed axillary pouches opposite the pedicles of L 4 and L 5. **Fig. 4.**—Normal myelogram illustrating some of the routine spot films which should be made whether or not a deformity is seen by fluoroscopy. Oblique films should never be omitted, but direct lateral views are seldom of any value.

sembling that produced by intervertebral disc herniation. Sacro-iliac slip has not been encountered by us, although several patients who have been found to have disc herniations were so diagnosed elsewhere for periods of varying length. Such an appearance can be produced by rotation of the pelvis which may be difficult to avoid when acute symptoms are present.

Unilateral sacralization of the transverse process of the fifth lumbar vertebra is quite commonly associated with herniation of the intervertebral disc immediately above it, that is, the disc between L 4 and L 5 (Fig. 2). Such a herniation may be on the same side as the sacralization, on the opposite side or bilateral. This fact should not be forgotten, as in the past many such patients with radiating sciatic pain have been called "structural backs". In only one such individual has a herniated disc between L 5 and S 1 been found. Presumably the herniations which occur immediately above such sacralizations result from the extra stress and strain produced by limited or abnormal motion at the sacralized level.

Calcification in the central portion of the intervertebral disc, possibly in the nucleus pulposus, is not very uncommon, particularly in the lower thoracic region, but this does not seem to be of any significance in relation to posterior disc herniation. Schmorl defects, small indentations in the superior and inferior surfaces of the vertebral bodies, are rarely seen in the lower lumbar region, but are common more cephalically where posterior herniations are uncommon. Very occasionally calcification occurs in the herniated portion of a disc protruding posteriorly into the spinal canal and this finding is rather diagnostic when present.

MYELOGRAPHY

1. *Oxygen or air.*—This method has been used extensively in the past but it has been completely abandoned at our clinic in the past three years. While it is entirely harmless it is often indefinite or negative in cases where disc herniation is present, as shown by other methods and proved by operation. Then too, it is usually of no help in the diagnosis of multiple herniations, which we feel are quite common.

2. *Thorotrast.*—It is now generally agreed that it is unwise to inject thorotrast into the spinal subarachnoid space, and we oppose this method, even though according to the advocates of this procedure 80 to 85% can subsequently be removed.

3. *Iodized oil.*—The injection of pantopaque is now the best available radiographic method for diagnosing posterior herniation of the intervertebral disc. When such herniation is so diagnosed it can almost invariably be found at operation now that laminectomy has been abandoned and the interlaminal approach adopted, so that the disc can be explored far laterally. Conversely the so-called "concealed disc" described by Dandy[10] is probably seldom concealed if a careful myelogram is performed. However, it is a rather highly specialized procedure and should not be attempted by those unfamiliar with the proper technique or by those who do not have adequate knowledge of the deformities produced by smaller herniations, as in such hands it is a menace. Furthermore, it is felt that it is contraindicated unless the roentgenologist is prepared to spend sufficient time to supervise aspiration. Even under the best circumstances this will occasionally be a tedious procedure, although usually it is not at all difficult.

In the anteroposterior view the width of the spinal canal can be accurately measured, the medial border of the pedicles corresponding to the most lateral portions of the bony canal. The normal subarachnoid space in the lumbar region, as outlined by oil, usually fills a considerable portion of the canal, but there is a good deal of normal variation and sometimes it is very wide and occasionally it is very narrow. Normally, there are regularly placed lateral projections opposite each vertebra, symmetrical on both sides at any given level, but usually more noticeable caudally than cephalically (Figs. 3 and 4). These lateral projections have been called axillary pouches by the Boston investigators, and they correspond to the medial borders of the nerve roots as they emerge from the subarachnoid space and the dural sac, which are in very intimate relationship with one another. Not infrequently the subarachnoid space fills for a short distance around the emerging root after it has passed through the dura, and occasionally this so-called sheath is visualized rather extensively. The axillary pouches tend to be close to the pedicles, and the pouches opposite the pedicles of L 5 correspond to the medial borders of the fifth lumbar nerves, the pouches opposite the

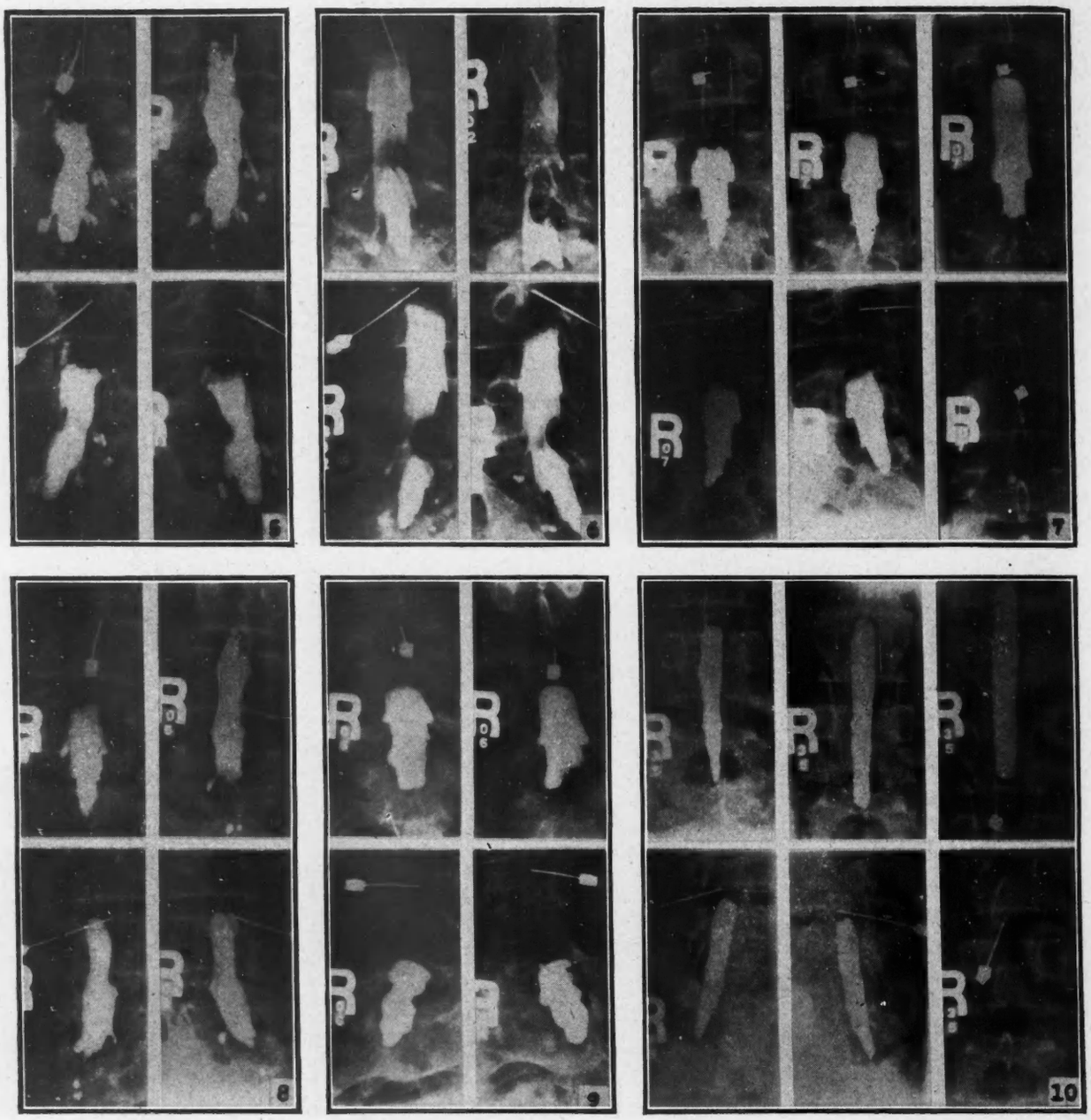
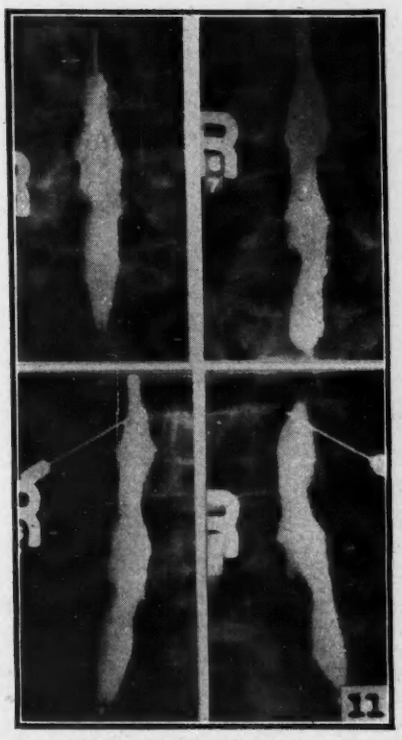


Fig. 5.—Herniation of the intervertebral disc between L 5 and S 1 on the right side. The defect is rather large but quite typical. **Fig. 6.**—Herniation of the intervertebral disc between L 4 and L 5 on the left side with large defect. **Fig. 7.**—There is slight elevation of the axillary pouch on the left side just above the intervertebral disc between L 5 and S 1, and the left lateral margin of the subarachnoid space opposite this disc is a little straighter than it is on the right. This man was a Captain in the R.C.A.M.C. who had been previously diagnosed elsewhere as sacro-iliac strain and treated conservatively without relief. Operation confirmed the presence of a left-sided posterior herniation of the disc between L 5 and S 1 and he has had no further complaints since that time. **Fig. 8.**—Herniation of the intervertebral disc between L 4 and L 5 on the left with small anterolateral indentation. **Fig. 9.**—Herniation of the intervertebral disc between L 5 and S 1 on the left with the oil column flowing off this side of the disc more rapidly than it flows off the right side. There is also a small anterolateral cutout and the axillary pouch is obliterated. **Fig. 10.**—An example of a very short subarachnoid space which ends opposite the upper margin of S 1. There is only very slight deformity of the right margin of the space opposite the disc between L 5 and S 1 although a fairly large herniation is present. With this type of short subarachnoid space it may be impossible either to diagnose or exclude herniation of the disc between L 5 and S 1.

pedicles of L 4, the medial borders of the fourth lumbar nerves, and so on.

The most caudal portion of the subarachnoid space usually lies opposite the second sacral segment and it is usually pointed. The majority of herniated intervertebral discs occur between L 5 and S 1 or between L 4 and L 5. When such herniations produce considerable deformity of the subarachnoid space they are readily shown, even with a small quantity of oil, and diagnosis is not difficult. The characteristic deformity consists of shortening, elevation, distortion or obliteration of the adjacent axillary pouch on the side of the lesion and of an indentation in the lateral margin of the subarachnoid space (Figs. 5 and 6). Oblique examination usually shows that the indentation is situated anterolaterally in the spinal canal. It tends to be directly opposite the involved disc but it may extend above or below the disc. Many herniations, however, are not so apparent, and may be missed completely unless a moderately large quantity of oil is used, hence the advisability of injecting at least 5 c.c. This is no extra hazard now that it can be aspirated and it is practically no more trouble to take out this amount than it is to remove only 2 or 3 c.c.

It is now realized that many myelograms, which originally would have been called negative, are really positive. A fair-sized herniation may produce relatively little deformity, particularly if it be between L 5 and S 1 where a large portion of the involved nerve is situated outside the subarachnoid space. Partial obliteration, or slight elevation, of an axillary pouch without any indentation of the subarachnoid space either laterally or anterolaterally (Fig. 7), or a small anterolateral indentation of the subarachnoid space with a relatively intact pouch (Fig. 8) may be just as significant as a much larger defect. The axillary pouch deformities are usually more pronounced when the region in question is filled with oil, but the smaller indentations of the margin of the subarachnoid space are sometimes more evident when most of the oil has flowed off the involved area, and may be completely obscured when the main bulk of the oil is opposite the lesion. Not infrequently it can be seen that the column of oil will flow off the herniated side of an intervertebral disc more rapidly than it will flow off the normal side (Fig. 9). Here fluoroscopy is of the greatest value, and spot films will confirm the fluoroscopic findings for future reference and often show them even more conclusively.



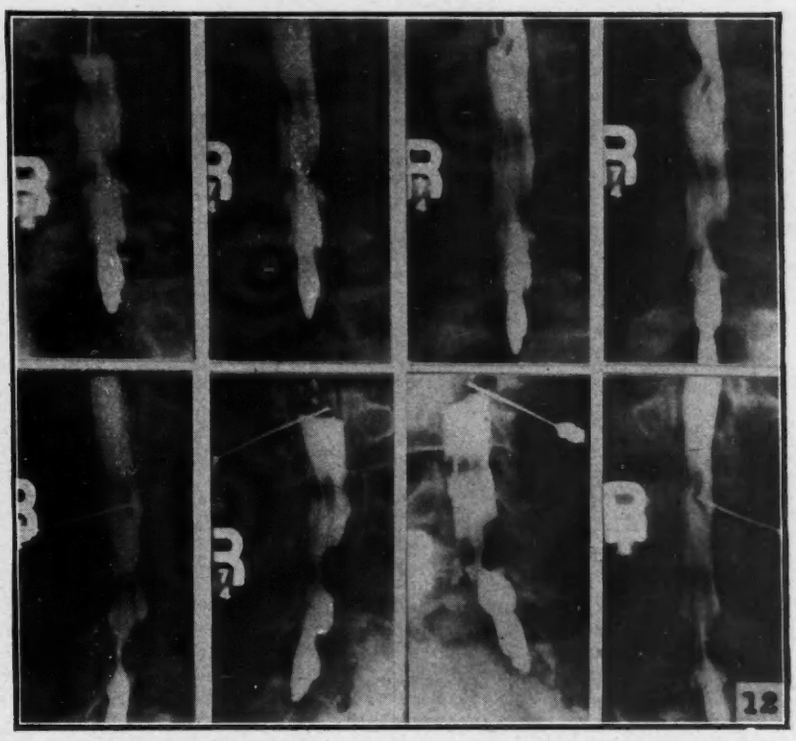
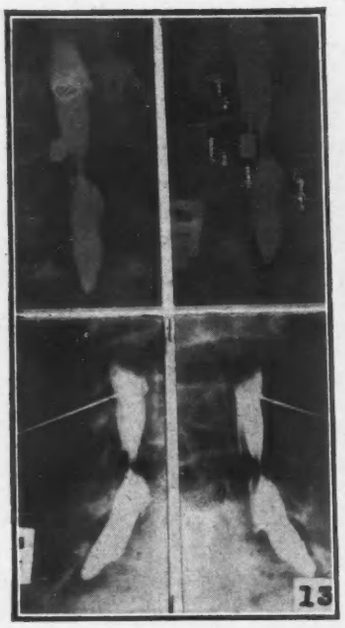
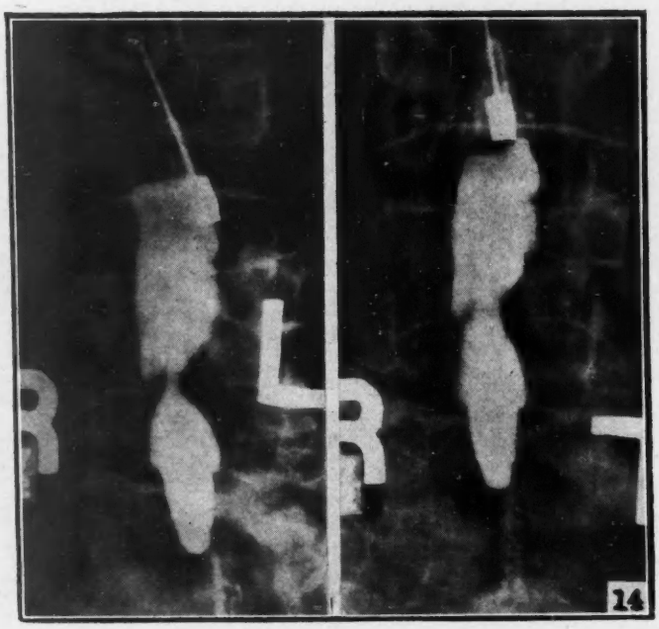


Fig. 11.—Herniation of the discs between L 5 and S 1 on the right and L 4 and L 5 on the left.
Fig. 12.—An extreme example of multiple herniated discs. Several of these have now been removed and the patient is much improved.

As previously stated the subarachnoid space usually ends somewhere opposite the second sacral segment. Occasionally, as emphasized by Camp,[11] it is quite short and ends opposite the extreme upper portion of S 1 or even higher. In such individuals the results of myelography may be inconclusive, as a herniation of the disc between L 5 and S 1 may be entirely caudal to the subarachnoid space or else opposite its tip where it is very narrow (Fig. 10). Under these circumstances myelography is useful only to diagnose or exclude a herniation more cephalically situated. Fortunately such short subarachnoid spaces are not very common.





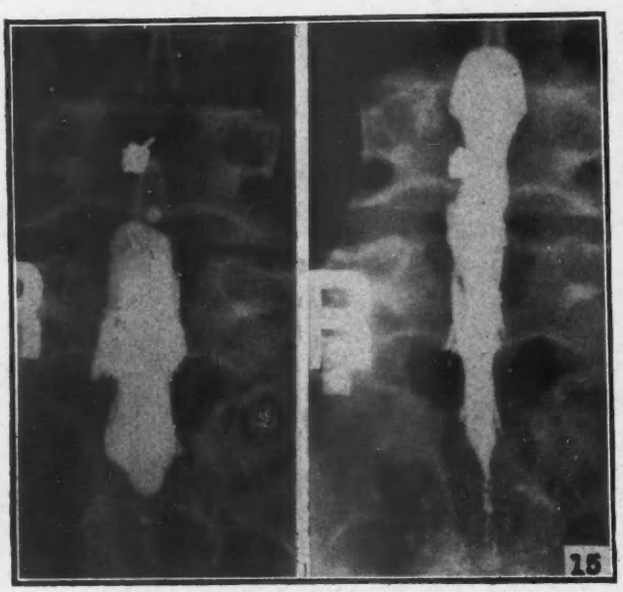
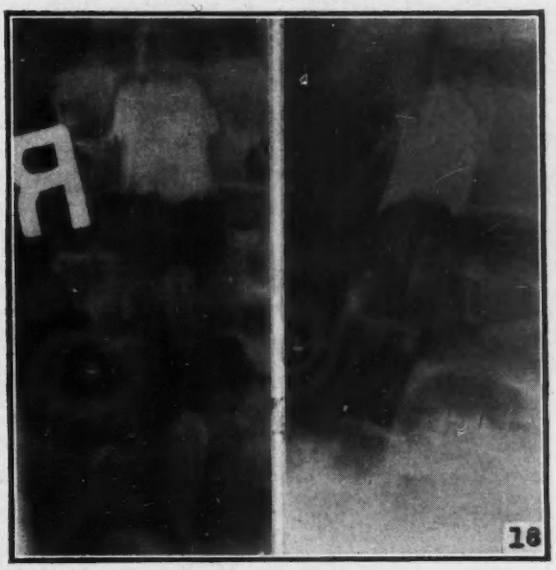


Fig. 13.—Bilateral posterior herniation of the intervertebral disc between L 4 and L 5. Fluoroscopic examination showed that the downward passage of oil was markedly delayed opposite this disc when the patient was placed erect with her weight on her feet but that the obstruction became much less marked when the horizontal position was assumed. **Fig. 14.**—Herniation of the intervertebral disc between L 4 and L 5 on the left. The radiograph on the right was made a few moments after the radiograph on the left. The patient was not moved in the interval but traction was applied to the head and feet and this reduced the narrowing of the subarachnoid space. **Fig. 15.**—The patient has not been moved between these two radiographs, but the narrowing and lengthening of the oil column shown on the right is due to voluntary straining. **Fig. 16.**—Another example of posterior herniation of a cervical disc. In this case pantopaque has been used and there is very little globule formation.

Posterior herniation of the intervertebral disc between L 3 and L 4 is less common than herniation of the two discs caudal to it but it occurs with moderate frequency. Some bilateral posterior prominence of this disc is fairly frequent, but such prominence is not necessarily significant if only of moderate degree and if of approximately the same extent on both sides. Herniations of the remaining intervertebral discs in the lumbar region and of the disc between T 12 and L 1 are still less frequent. Small posterior prominences in these regions, as shown by myelography, are apt to produce large filling defects in the oil column, as here there is normally less anterior curvature than that usually present more caudally, and the column of oil is generally much thinner. Herniations in the thoracic region are not



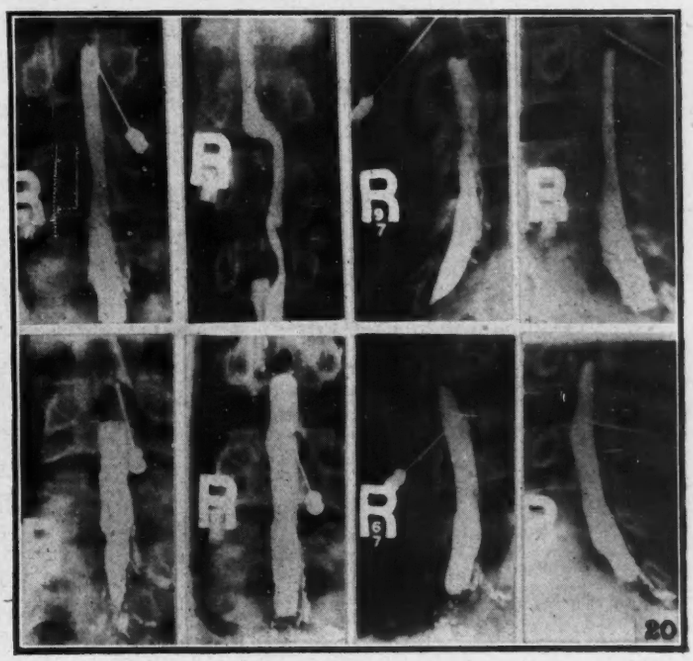


Fig. 17.—The plain film on the left shows narrowing of the intervertebral disc between C 6 and C 7, with rather minor hypertrophic bony changes. In the myelogram on the same patient there is a large defect indicating posterior herniation of the left side of the intervertebral disc between C 6 and C 7. **Fig. 18.**—Hæmangioendothelioma of the cauda equina. The lesion is subarachnoid in location and the filling defect whilst opposite an intervertebral disc is rounded and sharp, quite unlike that produced by an extradural lesion. **Fig. 19.**—Some of the oil is in the subdural space and this portion moves very little as the patient is postured. It displaces the subarachnoid space toward the midline. **Fig. 20.**—The upper four films were made a few days after a previous lumbar puncture and show an unusual series of deformities. These are probably due to the presence of subdural fluid, as a second myelogram made a few weeks later, as shown in the lower four films, fails to reveal any significant deformity of the subarachnoid space.

common and they tend to simulate cord tumours.

Multiple disc herniations in the lower lumbar region are much more frequent than was originally supposed, and this is another strong argument in favour of routine myelography. All possible combinations exist and as many as six have been diagnosed in one individual (Figs. 11, 12 and 13). Bilateral herniation of one disc often larger on one side than on the other is relatively frequent. It may be impossible to decide just which herniation is producing the symptoms of which the patient complains, for it is realized that not all herniated intervertebral discs cause symptoms, at least over a limited period of time. Unless there is some contraindication, such as old age or constitutional disease, or unless they be too numerous, it is customary to remove all such herniations when operation is performed.

Normal intervertebral discs become more prominent posteriorly when the spine is extended but with flexion the posterior surfaces of the vertebral bodies tend to separate, with resulting flattening of the intervertebral discs. Analogous findings may also be evident at myelography when posterior herniation is present, defects being less noticeable when the patient is flexed over a pillow and more evident following removal of the pillow with resulting moderate extension of the spine. Sometimes a more accurate estimate as to the presence or absence of herniation may be obtained by myelography with the patient extended slightly, than can be obtained on the operating table by palpation and inspection, with the patient of necessity rather strongly flexed to allow an interlaminal exposure.

It can often be shown that weight-bearing exerts a profound effect on the size of a herniation and the degree of obstruction of the subarachnoid space which it produces. It has been observed repeatedly that with a patient standing almost upright, with his weight on his feet, a herniated intervertebral disc will produce considerable delay in the downward passage of oil, while with the patient lying down, with the weight off the feet, the oil will pass cephalically quite readily, even with comparatively little lowering of the head (Fig. 13). In certain individuals traction on the shoulders and feet will reduce the size of a defect produced in the oil column by a herniated disc (Fig. 14). Presumably this means that traction widens the involved interspace and sucks part of the herniation back into the region from which it has escaped. The defect produced by a herniated intervertebral disc in an apprehensive and tense patient may be initially very much larger than it is later on in the procedure when the same individual has relaxed. Straining, voluntarily or involuntarily performed, tends to cause general narrowing of the subarachnoid space and consequent lengthening of the oil column (Fig. 15).

All the above observations tend to show that many herniated intervertebral discs are not static fixed lesions, but that they continually vary in size, depending on weight-bearing, flexion, extension, straining, etc. They also help to explain why the usual anterior curve may be shown to be diminished in plain radiographs; this is probably an involuntary attempt to widen the involved interspace posteriorly and reduce the size of the protruded portion of the disc. Scoliosis convex to the side of the lesion may also be explained on a similar basis; the resulting widening of the interspace on the affected side may well reduce the degree of herniation and lessen the pressure on the adjacent root.

B. Cervical Herniations

Plain radiographs.—It seems likely that many disabilities, formerly thought to be caused by cervical rib or scalenus syndromes, are really examples of herniated cervical discs, and that such herniations are much more common than has been realized.[12, 13]

There is often localized narrowing of the involved intervertebral disc and frequently there are local hypertrophic changes which sometimes project back into the spinal canal (Fig. 17). Oblique radiographs may show similar bony changes projecting into the adjacent intervertebral foramen.

Myelography

1. *Oxygen or air.*—This is very useful in high cervical lesions, but it does not usually visualize the lower portion of the cervical canal sufficiently well to be of any help in the intervertebral disc problem.

2. *Iodized oil.*—The cervical subarachnoid space is wide and relatively flat, and small midline filling defects opposite several of the

intervertebral discs are not necessarily of any significance. Characteristically a herniated cervical disc will produce a filling defect in the oil column opposite one of the lower cervical discs generally unilateral in situation (Figs. 16 and 17). Occasionally a herniation may be very large and produce a complete block, thus simulating a true tumour. Unfortunately surgery in this location is much more hazardous and difficult than it is in the lumbar region, and unfortunately too, herniation is often complicated by a good deal of hypertrophic new bone formation, which makes operation all the more difficult. Nevertheless, when there is serious disability, such as is often present in this type of lesion, accurate localization is essential, and if sufficient pantopaque (5 or 6 c.c.) is used it is felt that diagnosis should be just as accurate in the cervical region as it is in the lumbosacral region.

DIFFERENTIAL DIAGNOSIS

Hypertrophy of the ligamentum flavum *per se* is rare. A myelographic defect produced by such a lesion should be situated posterolaterally in distinction to a disc defect, which is anterolateral. One patient has been encountered in whom a hugely swollen nerve root produced a defect similar to a herniated intervertebral disc. In this case there was a herniation of the disc on the same side one interspace higher, so presumably the swollen nerve root was secondary to this herniation. In another patient there was a cyst of the apophyseal joint which produced a defect resembling a herniation of the disc and caused pressure on the nerve with resulting sciatic pain.

Certain individuals with complaints and clinical findings resembling those caused by posterior herniation of the intervertebral discs suffer from true tumours, and it is usually, but not invariably, possible to differentiate between these two conditions by myelography. If a tumour is subarachnoid in location the resulting filling defect will generally be much sharper than with an extradural lesion, such as a herniated disc (Fig. 18). With an extradural tumour the defect or block is usually not opposite the intervertebral space.

In spite of all precautions, pantopaque or lipiodol will occasionally be injected into the subdural space. Fluoroscopic examination reveals that such oil moves very little when the patient is postured (Fig. 19). Subdural fluid, due to a leak from a preceding puncture, may cause a very confusing appearance (Fig. 20).

SUMMARY

Plain radiographs should always be made as the first stage in the investigation of a patient in whom a herniated intervertebral disc is suspected. These films usually are not diagnostic of such a herniation, but they may offer suggestive evidence and they help to exclude other lesions.

Myelography when properly performed, using pantopaque with subsequent aspiration, is a very accurate and safe method of diagnosing or excluding a herniated intervertebral disc, and it should be used routinely before operation is undertaken.

Multiple disc herniations are not at all uncommon and many unsatisfactory results may be explained on this basis, if operation is undertaken without previous myelography.

Herniations of sufficient size to produce marked disability may cause only comparatively small deformities of the subarachnoid space. Hence the use of a relatively large quantity of oil is advisable, and multiple spot films should be made routinely to avoid missing minor deformities not readily seen under the fluoroscope.

Myelography reveals that the size of some herniations undergoes marked change due to such factors as weight-bearing, traction, muscular activity, flexion and extension.

Herniated intervertebral discs in the cervical region are not very uncommon, but here herniation is often complicated by hypertrophic bone formation.

Tumours in the lumbar and sacral regions, and occasionally in the cervical region, may produce signs and symptoms which are clinically indistinguishable from those produced by herniated intervertebral discs. Myelography should always indicate the exact site of such lesions and it will usually differentiate between a tumour and a herniated disc.

REFERENCES

1. MIXTER, W. J. AND BARR, J. S.: *New Eng. J. Med.*, 211: 210, 1934.
2. MIXTER, W. J. AND AYER, J. B.: *New Eng. J. Med.*, 213: 385, 1935.
3. HAMPTON, A. O. AND ROBINSON, J. M.: *Am. J. Roentgenol.*, 36: 782, 1936.
4. REICHERT, F. L.: *West. J. Surg.*, 47: 297, 1939.
5. CHAMBERLAIN, W. E. AND YOUNG, B. R.: *J. Am. M. Ass.*, 113: 2022, 1939.
6. NICHOLS, B. H.: *Radiology*, 38: 679, 1942.
7. KUBIC, C. S. AND HAMPTON, A. O.: *New Eng. J. Med.*, 224: 455, 1941.
8. STEINHAUSEN, T. B., DUNGAN, C. E., FURST, J. B., PLATI, J. T., SMITH, S. W., DARLING, A. P. AND WOLCOTT, E. C., WITH WARREN, S. L. AND STRAIN, W. H.: *Radiology*, 43: 230, 1944.

9. RAMSEY, G. H., FRENCH, J. D. AND STRAIN, W. H.: *Radiology*, 43: 236, 1944.
10. DANDY, W. E.: *J. Am. M. Ass.*, 117: 821, 1941.
11. CAMP, J. D.: Contrast Myelography, Medical Clinics of North America, 25: 1067, 1941.
12. SEMMES, R. E. AND MURPHEY, F.: *J. Am. M. Ass.*, 121: 1209, 1943.
13. SPURLING, R. G. AND SCOVILLE, W. B.: *Surg., Gyn. & Obst.*, 78: 350, 1944.

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INFECTED CHEST WOUNDS AND SUCTION DRAINAGE

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DURING the war 1914-1918 the results of treatment of chest wounds were not good. The figures given in the Medical History of the War show that of penetrating wounds of the chest with hæmothorax, 25% healed without infection while 75% became infected and required rib resection. Of these more than 50% died and of the remainder more than half had permanent fistulas into the pleural cavity. Two main factors were responsible for these appalling results. First, there were no efficient agents to overcome infections, and secondly, there were no methods for promoting re-expansion of the collapsed lung after rib resection. In the present war there are penicillin and the sulfonamides to combat infection, and by their use most chest wounds remain clean, but the second factor of re-expansion of the collapsed lung after rib resection in the infected cases still requires study.

An infected hæmothorax differs from an empyema in that the lung is totally collapsed and has lost all contact with the parietal pleura, also the mediastinum is displaced laterally. Aspiration of a hæmothorax creates a vacuum in the pleural cavity, consequently, the mediastinum is replaced and the lung expands to fill the pleural cavity, *i.e.*, a closed drainage is effected. But in the cases where rib resection is necessary this vacuum is lost. The mediastinum remains displaced and the lung collapsed and if this situation is not corrected the outlook for the patient is bad. Closed drainage is also needed here. The ordinary case of empyema is a collection of pus localized by adhesions between the lung and parietal pleura so only a portion of the lung is collapsed. The pus-soaked dressings seal over the drainage tube and produce a partial vacuum preventing the ingress of air during inspiration and so most of these cases eventually heal with open drainage.

The case reported here is interesting because it is similar to a battle casualty suffering a penetrating chest wound complicated by hæmothorax and infection and requiring rib resection. Penicillin was not available but by the use of sulfadiazine and suction drainage the infection was overcome, the lung was expanded to fill the pleural cavity, and the patient cured.

CASE REPORT

Male, aged 28, a drug addict and of poor physique, fell 30 feet on to a cobblestone pavement, landing on his back. He suffered a fractured scapula and eight ribs on the left side were fractured. He arrived in the hospital pulseless and in severe shock. The lung

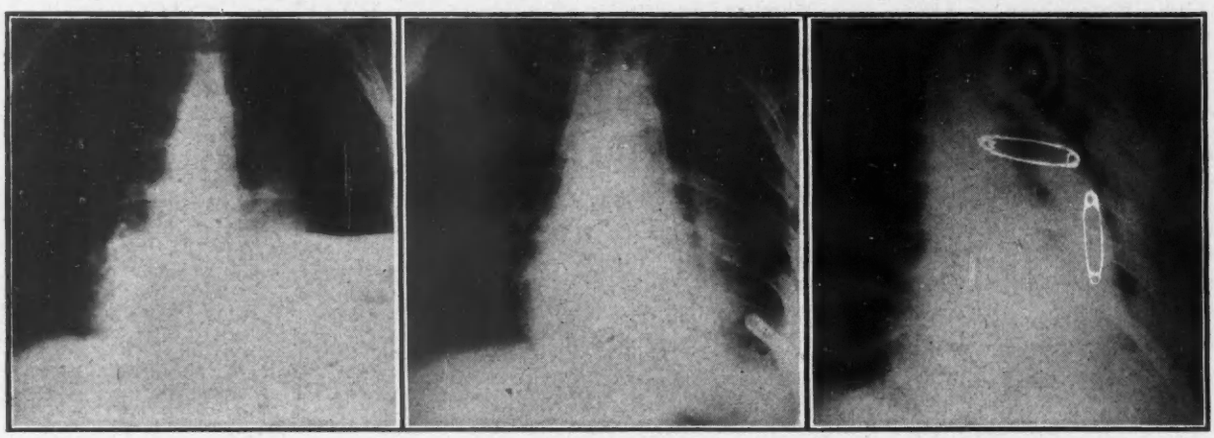

Fig. 1 **Fig. 2** **Fig. 3**

Fig. 1.—Pneumothorax left side with lung badly collapsed and fluid filling lower portion of thorax. Mediastinum and heart badly displaced to right. **Fig. 2.**—Taken one week after rib resection. Lung expanded about 50% and mediastinum in better position but large cavity still present. No fluid in chest and end of drainage tube seen in lower angle. **Fig. 3.**—Taken three weeks after rib resection. Lung shows better expansion and mediastinum in good position. Plate still shows an empyema cavity extending from apex of lung to base. Drainage tube seen in lower angle was too short to provide suction at upper portion of cavity, and was replaced with longer one.

had been punctured, consequently he developed surgical emphysema and a left pneumothorax. Blood-stained serous fluid collected in the pleural cavity. He ran a daily temperature of 100 to 104° and was irrational most of the time. Pleural exudate was sterile for three weeks and then gave a culture of hæmolytic streptococcus. An x-ray plate at this time showed a pneumothorax with a fluid level, the lung badly collapsed and the mediastinum displaced to the right (Fig. 1). A rib resection was done and his condition was critical. Suction drainage was started in 24 hours and there was a prompt though gradual improvement in his condition. After three weeks his temperature was normal and his mental condition cleared. An x-ray taken one week after the commencement of suction drainage showed the lung expanded 50% and less displacement of the mediastinum (Fig. 2). Two weeks later an x-ray plate showed the mediastinum in good position and further expansion of the lung, but there was a narrow cavity extending from the apex of the lung to the thoracotomy opening (Fig. 3).

The suction apparatus was being removed daily and the cavity irrigated with Dakin's solution and by this time the cavity would hold only three ounces of solution. For one month after this the case made no progress, as the cavity failed to decrease in size. This was a puzzle. The drainage tube in use reached into the pleural cavity about two inches, and it appeared that the suction drew the adjacent lung tight around the tube and the suction was therefore cut off from the upper part of the cavity above the end of the drainage tube. A long tube was then used which would reach well up towards the apex of the lung and allow the suction to act throughout the cavity. The cavity now showed a gradual decrease in size and after another month of constant suction and daily irrigation the cavity held only three drams, or about the area occupied by the tube. The discharge from the cavity was almost nil. Suction was stopped and the remaining cavity filled with a paste of 30% bismuth and 5% sulfathiazole. It closed promptly. The patient was in hospital from April 2 to August 12. Had a long drainage tube been used earlier hospitalization would have been much less.

The suction drainage apparatus for use in empyema cases was described in this *Journal* (**22**: 368, 1930). It is very simple and consists of a square of "inner tube" rubber 9 x 9" which is held tight to the chest wall over the thoracotomy opening by a large pad and a many-tailed binder. Through the centre of this rubber sheet is run a length of ¼ inch rubber drainage tubing, the inner end reaching into the chest cavity, the outer end being attached to a suction apparatus. The joint between the rubber sheeting and the drainage tube is vulcanized or made air-tight by a tie over a short length of glass tube inserted into the drainage tube. This makes an air-tight union with the skin of the chest wall. It is not irritating and can be used indefinitely. The suction used in this case was obtained from the Wangensteen stomach suction apparatus used in most hospitals. The care of the suction and the daily dressings were in charge of a succession of pupil nurses and gave no trouble.

Generally the patient could stand the full suction produced by the apparatus though the discharge from the chest was blood-tinged. At times he complained of a dragging pain in his chest and this disappeared when the vertical distance between the two water containers was decreased from four feet to one foot. The amount of discharge from the chest was considerably increased by the suction, amounting to six ounces daily at first. This outflow of serum would carry away much toxic material which would be otherwise absorbed. Suction drainage saved the life of this patient. Some use might be made of it in battle casualties of a similar nature.

CANALIZATION OF COMPLETE ŒSOPHAGEAL STRICTURE*

(Report of Case)

By Angus A. Campbell, M.D.

Toronto

PARTIAL obstruction of the œsophagus is a common affliction and may be the result of many causes. Its treatment is usually attended with favourable results. Complete congenital obstruction is not amenable to treatment and is in most instances incompatible with life.

On the other hand complete acquired obstruction of recent origin is amenable to treatment and may be successfully dealt with if the patient can be made to swallow a thread. Often a thread can be swallowed when fluids apparently cannot. The thread is used as a means of guiding bougies either from above or through a gastrostomy opening from below. The risks are great but the results are good. Many such cases are reported by Tucker[1] and others. Fletcher and Woodward[2] report a case in which permeation of a complete cervical obstruction was made by an external operation. Carroll and Myers[3] used a cystoscope and corkscrew catheter from below in a complete stricture of short duration. Imperatori[4] mentions a case of short duration in which he passed a bougie from above using his finger below through a gastrostomy opening as a guide.

When however the œsophageal lumen has

* Read before the Section of Medicine, Academy of Medicine, Toronto, January 16, 1945.

closed completely and has been allowed to remain closed for a long time the re-opening of the natural passage is a difficult procedure. As far as I am aware after an extensive search of the literature the following is the first case of this kind to be dealt with in this manner.

M.LaP., aged 14, was admitted to the Toronto General Hospital under Dr. Cleaver on May 22, 1944. His mother gave a history of his having had gastric distress and vomiting dating from infancy. The trouble increased and was associated with progressive difficulty in swallowing to such an extent that nothing passed by mouth and symptoms of starvation developed. There was no history of his ever having swallowed lye or other irritants. A gastrostomy was done as a life-saving measure at another hospital when the boy was 5 years old, and he has been fed through the gastrostomy wound ever since. We have no knowledge of any attempt having been made to pass a thread by swallowing at that time but in any case the obstruction became absolute and has remained so for nine years. During these years the boy was always mentally alert but physically he was thin, wasted and underweight.

Medical examination was for the most part negative, but x-ray examination, with thin barium, showed a dilated smooth-walled œsophagus ending blindly at about the junction of the middle and lower thirds. This examination was later confirmed by direct œsophagoscopy. A 9 mm. œsophagoscope was easily passed down from above to a pale smooth-walled complete stricture, about the middle of which was a small dark spot about 2 mm. in diameter. This dark area was undoubtedly the occluded lumen of the œsophagus but all attempts to pass soft or firm bougies through it were unsuccessful. It was felt that this was not a congenital stricture but most likely the result of an ulcerative œsophagitis of unknown origin.

Two weeks later a second attempt was made, this time using two œsophagoscopes, one entering from above and the other passing through the gastrostomy opening from below. It is much more difficult to enter the œsophagus from the stomach than from above. The stomach must first be emptied of fluid and almost continuous suction maintained to keep the field relatively dry. Our method consisted of inserting the œsophagoscope directly backward through the gastrostomy wound for about two inches, then abruptly upward and slightly to the patient's right to the lesser curvature of the stomach, then posteriorly until the vertebral column could be felt. Search was then made for the œsophageal opening. Many attempts were

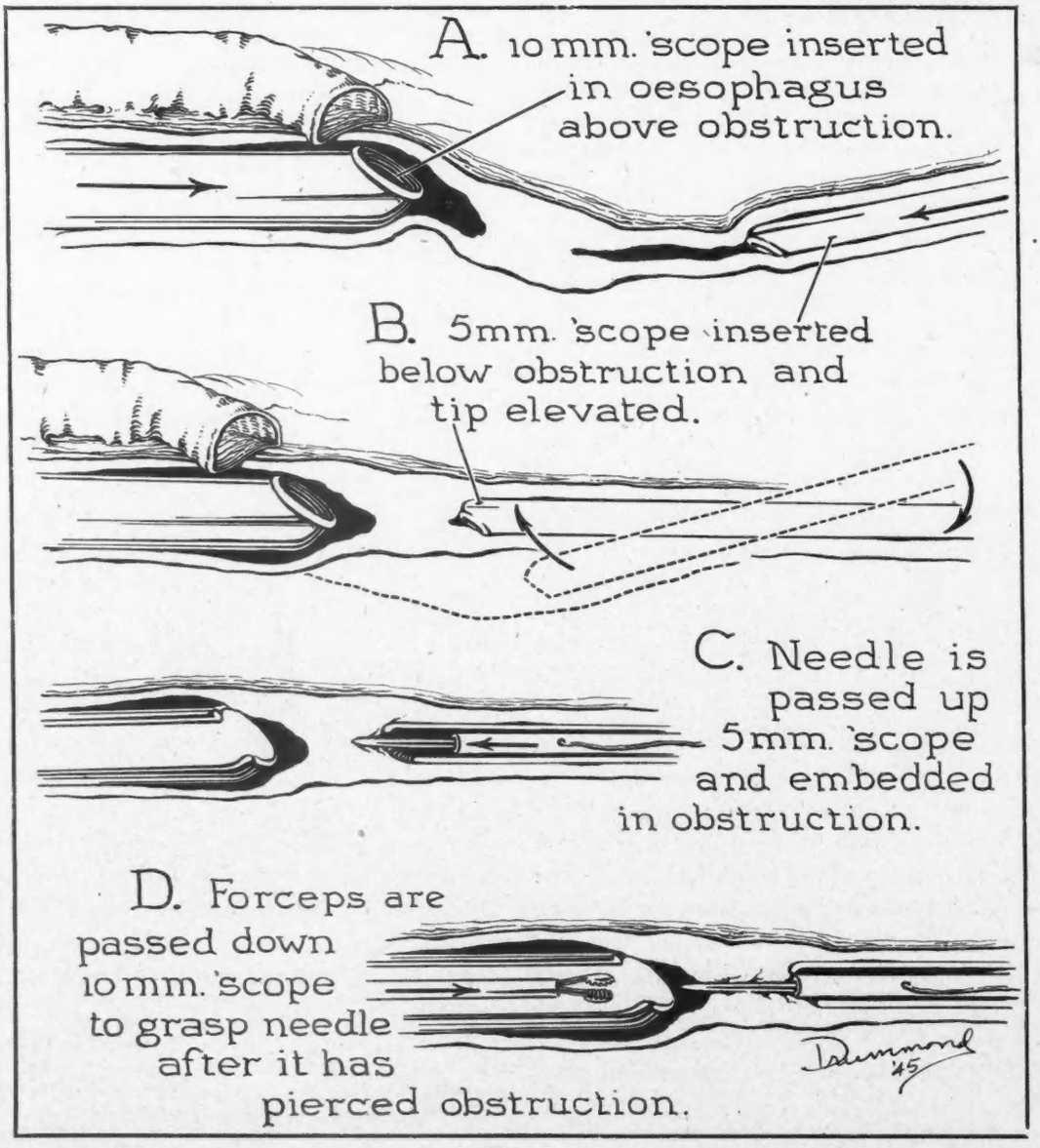
A. 10 mm. 'scope inserted in oesophagus above obstruction.
B. 5mm. 'scope inserted below obstruction and tip elevated.
C. Needle is passed up 5mm. 'scope and embedded in obstruction.
D. Forceps are passed down 10 mm. 'scope to grasp needle after it has pierced obstruction.
Drummond 45

Fig. 1

required since the instrument easily slipped beyond the cardiac opening and up into the fundus of the stomach where we were temporarily lost. That the instrument is in the fundus cavity is shown by the fact that during respiration the excursion of the diaphragm will push the œsophagoscope back over an inch with every breath. Entry to the œsophagus is confirmed by the absence of diaphragmatic excursions and by the pounding of the heart against the side of the instrument.

In this patient the lower end of the œsophagus was so small and atrophic, and the walls were so irregular that only our smallest œsophagoscope (5 mm.) could be inserted. When the two instruments were finally in their proper positions they were approximated as closely as possible and the solid obstructing mass between them carefully measured. The distance was about five-eighths of an inch. Soft and firm bougies were used to try to force a passage both from above and from below but without any success.

After a ten-day period, a third attempt was made, hoping that the trauma from the previous operation might have caused sufficient softening of the tissues to allow a bougie to pass. To our surprise and disappointment the trauma had caused so much swelling that the obstructing mass had really increased from five-eighths of an inch to three-quarters of an inch and all attempts at bouginage failed for a third time.

The situation now seemed desperate, and œsophagoplasty with its multiple major operative procedures and its high mortality rate had to be considered. Dr. Cleaver and the patient's mother did not favour this idea and seemed to be willing and anxious to assume any reasonable risk to open the natural canal, if some other means could be devised.

Further trauma and electrical incision were considered but rejected largely on the advice of Professor William Boyd who felt that the danger of infection was too great if the tissues were damaged unduly.

It was then thought that if a clean surgical cutting needle with at least six feet of thread doubled could be passed through the obstruction the resulting wound would be no more dangerous than a stitch abscess. The patient's resistance, fortified if necessary by chemotherapy should be able to take care of this initial infection. From then on gradual dilatation, using Abbe's method should restore a functioning œsophagus.

Consequently a model was made on a wooden base. Two pieces of half-inch garden hose, one to represent the upper and the other the lower portion of the œsophagus were fastened to the base. Several layers of leather were made to represent the obstruction. The tubes were set as nearly as possible at the same angles that the œsophagoscopes were in while the patient was being examined.

The operation was rehearsed many times on the model to develop the best technique and to anticipate and if possible to prevent, all probable accidents. A needle holder was devised to fit the lower œsophagoscope snugly, to hold the needle and thread firmly and force it through the obstructing leather. It was found

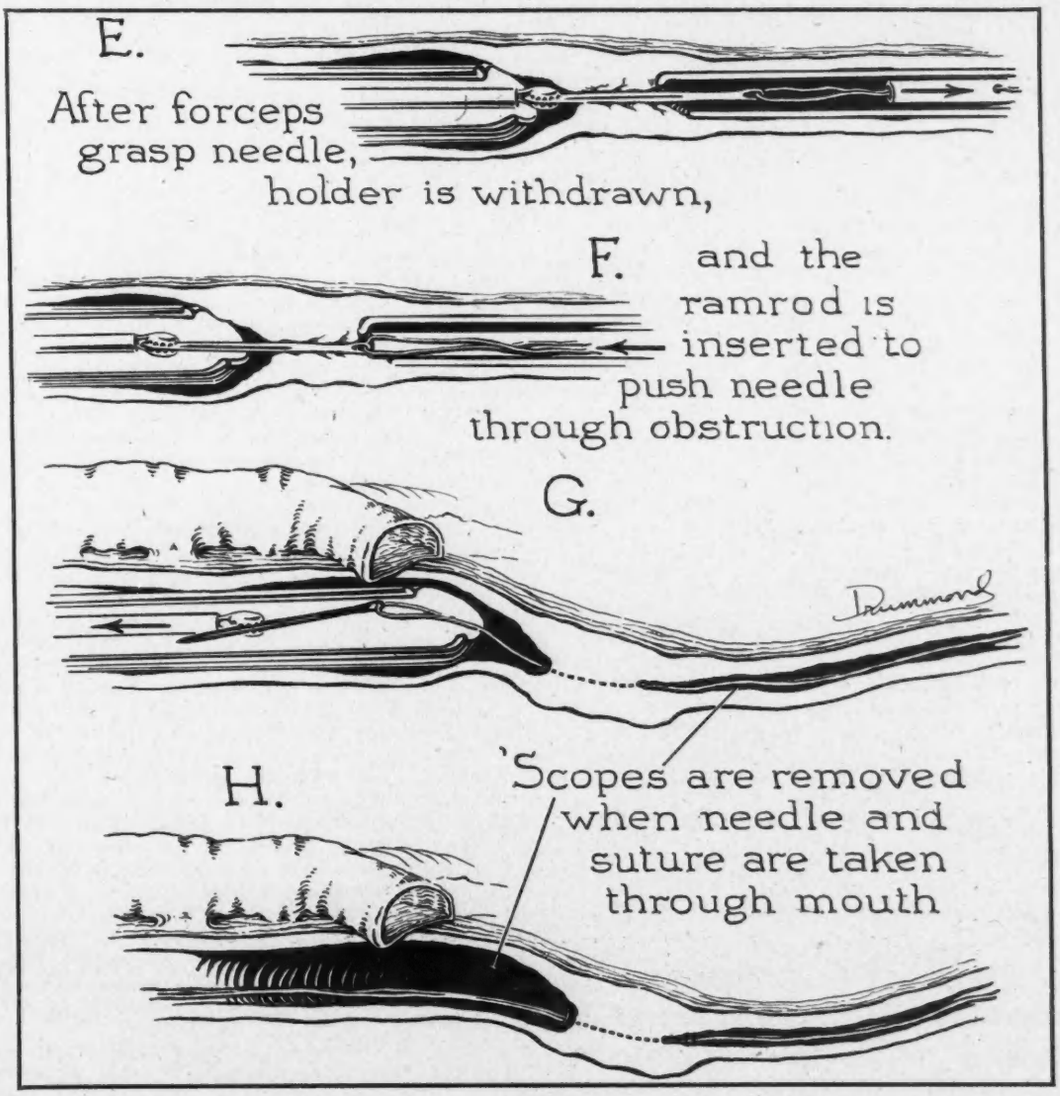

Fig. 2

that a two-inch needle was the longest one that could be manipulated safely through the leather, around the angle and into the upper instrument. Yet the point of the two-inch needle could not be pushed sufficiently far through the leather so that any grasping forceps in our possession could pull it and the thread through the obstruction. Consequently, a ramrod was devised to push the needle through the obstruction, while the grasping forceps held the needle and guided the tip into the upper œsophagoscope where finally both the needle and the thread could be brought to the surface.

After the operation had been rehearsed many times on the model a final attempt was made on the patient. He was placed on the fracture table, anæsthetized and a folded sheet placed under the mid-thoracic region to straighten the vertebral column. The œsophagoscopes were placed in position and by means of biplane fluoroscopy were lined up and the obstruction identified. The threaded needle and holder were inserted through the lower instrument and the needle slowly forced through the obstruction to make a "bull's-eye" as it appeared in the upper œsophagoscope. A grasping forceps through the upper instrument seized the needle point, guided it into the upper œsophagoscope and held it securely while the needle-holder was disengaged and the ramrod pushed the body of the needle far enough through the obstruction so that the grasping forceps could pull the needle and thread completely through it and finally into the patient's mouth (Figs. 1 and 2).

The eye of the needle was crushed and the loop of thread brought out through the patient's nose and securely fastened behind his ear. The loop on the thread was purposely preserved, so that having no knots, it could be used later for the purpose of further dilatation.

The patient was returned to bed and his reaction closely watched. He had very little distress, complained of some slight thoracic pains, ran a fever up to 101° for about ten days but at no time was chemotherapy considered necessary.

Three weeks later when all reaction had subsided two threads were run through the first loop and these easily pulled from above down through the obstruction and out through the gastrotomy opening, thus making four strings in all. As no reaction occurred a week later three double strings were pulled from below up thus making six strings through the lumen. In another week larger strings were used to further dilate the passage. It was noticed that the strings were bloodstained every time they were changed, showing that some granulation and epithelium had been lost. Their further use was discontinued as soon as the smallest retrograde bougie could be passed. Thin barium now passed easily by mouth and our boy swallowed food for the first time in his recollection. Due to a dietary indiscretion a gastric disturbance occurred and during regurgitation surgical emphysema developed on the whole left side of the thorax. Fortunately there was no fever or other complication and the air soon absorbed. Retrograde bouginage was continued weekly until a 36 F. could be passed easily. The patient was now placed on full diet.

Further bouginage will be necessary for some time to come and maybe indefinitely. Our patient has gained in weight and has undergone a great psychological change. The thread and gastrostomy tube were kept in position for some months as a precaution against accidents, but in March, 1945, bougies up to 40 F. having been passed from above the thread was removed and the gastrostomy wound allowed to close after being open for more than nine years.

Fate has been kind to us in this case, and we are able to add another means of attack to the already many ingenious methods used in these desperate cases of œsophageal obstruction.

REFERENCES

1. TUCKER, G.: Cicatricial stenosis of the œsophagus with particular reference to treatment by continuous string retrograde bouginage with the author's bougie, *Ann. Otol., Rhinol. & Laryngol.*, **33**: 1180, 1924.
2. WOODWARD, F. D.: Complete cicatricial stenosis of the œsophagus: permeation made possible by external operation in certain cases, *Ann. Otol., Rhinol. & Laryngol.*, **51**: 94, 1942.
3. CARROLL, G. AND MYERS, E. L.: The use of the cystoscope in impassable œsophageal stricture, *Urol. & Cut. Rev.*, **41**: 96, 1937.
4. IMPERATORI, C. J.: Complete atresia of œsophagus, *Ann. Otol., Rhinol. & Largyngol.*, **40**: 1192, 1931.

86 Bloor St. W.

RADIOLOGICAL FINDINGS IN LESSER SAC EFFUSION*

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London, Ont.

TWO unusual cases encountered during the past year, in both of which a collection of fluid in the lesser peritoneal sac was a prominent feature, seem to merit being reported.

CASE 1

(From the service of Dr. M. A. Platt). The patient was a female child aged 2 years who was in good health until a sudden attack of severe abdominal pain, shock and collapse at stool. Shortly afterwards she recovered and ate her supper, but the abdomen soon became distended, steadily increasing with intermittent crampy pain and vomiting of frothy fluid, and no bowel movement. She was admitted to hospital six hours after the onset of illness, when the abdomen was found to be grossly distended, tense and rigid; but no mass was palpable. The white cell count was 22,500.

Several consultants advised against surgical exploration. Eight hours after onset, there developed a swelling and crackling of the soft-tissues of the neck and upper chest, which became progressively worse. Aspiration of stomach contents produced 15 c.c. of colourless fluid with a flocculent sediment, microscopically negative for blood. The temperature ranged between 99 and 100° F., with pulse fast and irregular. Radiological investigation (Fig. 1) was limited to an antero-posterior survey film in the supine position, because of the patient's poor condition, and revealed a circular grape-fruit sized area of faintly stippled increased density in the upper left abdominal quadrant, with downward displacement of the air-visualized splenic flexure of the colon to the level of the iliac crest. There was a small pocket of air in the lower mediastinum, also a triangular opacity in the region of the dome of the left leaf of the diaphragm measuring about 2 x 2 inches, but the lung fields were otherwise clear, with no abnormality of the heart shadow. The splenic shadow was not evident, but the left kidney outline was visible and appeared normal. The stomach bubble was absent.

* Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Radiology, Toronto, Ont., May 25, 1944.

The findings suggested possible volvulus of the stomach, a collection of fluid and air in the lesser peritoneal sac, or partial herniation of the stomach through the diaphragm. Further x-ray study six hours later showed a decrease in size of the cystic area with tracking of the mediastinal air into the soft-tissues of the neck, suggesting a ruptured abdominal viscus. The lower left lung field had become less radiolucent, with shifting of the heart to the right.

The child's condition became progressively worse, death occurring about 22 hours after onset of the illness.

The necropsy findings were reported by Dr. F. W. Luney as follows:

"On opening the abdomen it collapsed with escape of foul smelling gas. The abdominal cavity contained reddish-brown fluid including gastric contents with green vegetable matter. There was no evidence of active peritonitis. The foramen of Winslow was patent and exuded fluid containing gastric contents into the peritoneal cavity. In the chest, from the hiatus of the diaphragm to the root of the neck, the mediastinal connective tissues showed an extensive emphysema extending into the hilus of each lung. The left leaf of the diaphragm showed a spheroidal diverticulum-like projection into the left pleural cavity measuring approximately 5 cm. in diameter, with a neck admitting two fingers. The pouch contained the spleen and fundus of the stomach. The peritoneal and pleural surfaces were smooth, glistening and free. The stomach was collapsed and empty with walls soft, lustreless and somewhat greenish-coloured suggesting beginning necrosis. On opening the stomach the gastric mucosa showed marked œdema, congestion and hæmorrhage, with a perforation approximately 2 cm. in diameter located on the posterior wall of the fundus near the greater curvature. The margins of the perforation were soft, thin and gangrenous, with adjacent intramural hæmorrhage. The lesser peritoneal sac contained a large quantity of gastric contents which had apparently been expelled from the stomach, and were escaping into the general peritoneal cavity. The spleen was located in the pouch of the diaphragm, normal in size and appearance with no adhesions."

Post-mortem diagnosis.—Congenital diverticulum (localized eventration) of left leaf of diaphragm, containing fundus of stomach and spleen. Strangulation and perforation of stomach with extravasation of gastric contents into lesser peritoneal cavity, thence into greater peritoneal cavity. Pneumoperitoneum with interstitial emphysema of mediastinum and soft-tissues of neck.

CASE 2

(From the service of Dr. L. D. Wilcox). This patient was a female, aged 58, who had suffered from recurrent attacks of pain below the right costal margin with dyspeptic symptoms for the past 25 years, recently becoming severe, with transmission to both shoulder-girdle areas. The icteric index was 25. The gallbladder was removed and adhesions found extending from it to the liver and omentum. The pathological report was, "a tensely distended gallbladder measuring 3 x 5 cm.; peritoneum thickened with adhesions; small bulging diverticulum-like mass in peritoneum of gallbladder, 6 mm. in diameter, containing a small yellow-bile calculus; gallbladder distended with brownish inspissated bile containing a few small calculi; wall thick and rigid with mucosal atrophy. Microscopically, there was connective tissue proliferation with diffuse lymphocytic infiltration." The pathological diagnosis was chronic cholecystitis with cholelithiasis.

The postoperative course was uneventful with continuous drainage, bloody and purulent, almost arrested at time of discharge from hospital on the 22nd postoperative day.

Attacks of colicky pain recurred and continued for about two months, when the patient suffered a severe chill with pain in the left shoulder area and epigastric distress. Dullness in the left chest downwards from the 7th rib led to aspiration in the 9th interspace posteriorly, when about 1,000 c.c. of fluid resembling thick bile was removed. On admission to hospital she was toxic in appearance with rapid pulse but

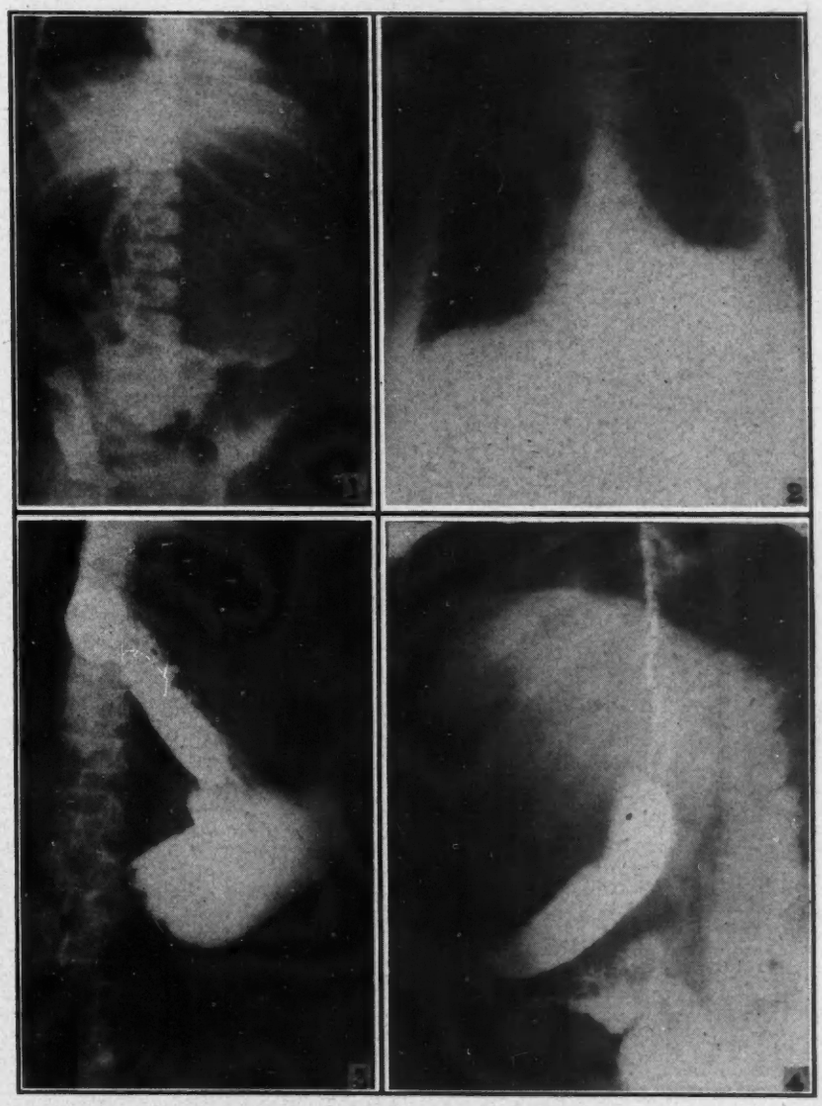


Fig. 1.—Large circular shadow of distended lesser sac. **Fig. 2.**—Radiographic changes in chest from distended lesser peritoneal sac, simulating gross pleural effusion. **Fig. 3.**—Deformity of barium-filled stomach in lesser sac effusion (supine posture). **Fig. 4.**—Deformity of barium-filled stomach in lesser sac effusion (lateral recumbent position).

normal temperature, and was not dehydrated or jaundiced. The abdomen was tense with a tender area of dullness in the mid-hypochondrium extending downward to the umbilicus, with a rounded lower border. The stools and urine were negative for bile; the white cell count was 17,500; blood sugar 153; urine diastase 66 units on two examinations; icteric index 18, and blood sedimentation rate 73 mm. per hour.

The recorded clinical impression was extravasation of bile confined to the lesser peritoneal sac by a closed foramen of Winslow. X-ray studies (Fig. 2) were confirmatory, revealing obscuration of the lower third of the left lung field by a homogeneous opacity of fluid density below the level of the 5th rib anteriorly, with a concave upper border reflected upwards along the lateral chest wall. The upper two-thirds of the left lung were over-aerated, with a thick transverse strand in the mid-lung field. The heart and mediastinum were displaced to the right. Radiograph of the abdomen showed elevation of the left leaf of the diaphragm to the level of the 6th rib anteriorly, with gross expansion of the pancreatic area, confluent with the liver shadow. The upper pole of the left kidney and the entire right kidney outline were visible and apparently normal. After barium administration the upper stomach border was observed to be displaced inferiorly and posteriorly about three to four inches, apparently by pressure (Figs. 3 and 4). The stomach wall showed increased compressibility on fluoroscopic palpation.

At operation on the day following the x-ray examination, about 1,000 c.c. of brownish yellow fluid were drained from the lesser peritoneal sac. There was no fluid in the greater sac. A specimen of liver was removed for biopsy and showed proliferation of bile ducts with leucocytic infiltration. The yellow-coloured fluid showed clumps of fibrinous exudate. The pathological diagnosis was hepatic degeneration, cholangitis and bile peritonitis of lesser sac.

The second postoperative period was uneventful, except for slight vomiting and sweating. Urobilin was present in the fæces on the 1st day, but the urine was repeatedly negative for bile. The urine diastase was 66 units on the 5th day after operation. X-ray examination 3 weeks after operation showed downward, mesial and anterior displacement of the cardia of the stomach with an orange-sized indenture of the upper half of its greater curvature, about 60% smaller than at the preoperative examination. The lungs were clear and the heart shadow normal. At discharge from hospital on the 22nd postoperative day, tube drainage had ceased and the abdomen was soft, with no tenderness or palpable tumefaction. Her subsequent course was good and she is now essentially free from signs and symptoms.

A possible sequence of events in this case is that subsequent to the first operation there was a leakage of bile around the drainage tube in the cystic duct. This bile drained by gravity to the area of least resistance through the foramen of Winslow into the lesser peritoneal cavity, rather than along the drainage tube to the abdominal surface. The marked tension of the effusion probably resulted from three factors: (1) a ball-valve effect at the foramen of Winslow permitting inflow of the bile but no egress; (2) an outpouring of serum from the walls of the sac in response to chemical irritation of bile salts in the bile drainage, and (3) the bellows action of the diaphragm, producing a hypertensive hydroperitoneum similar to the formation of a hypertensive pneumothorax in lung collapse with a broncho-pleural fistula.

Other possible sources of the bile in this case were (1) injury to the portion of the common bile duct that passes through the wall of the lesser sac; and (2) slow filtration of bile through the duct walls as a result of increased permeability due to a pathologic process. The latter possibility is doubted by many surgeons, who believe that bile peritonitis is never encountered except where a duct has been injured at operation or a ligature subsequently slipped.

Wangensteen[1] believes that the escape of any considerable quantity of bile into the human peritoneal cavity, unless removed, is always fatal from cholæmia, but Ravdin[2] has shown that large peritoneal accumulations of bile-stained fluid occasionally occur and are apparently innocuous, probably because the concentration of bile salts is low. It would seem that the amount of escaped bile and the degree of its dilution by effusion from the peritoneal surfaces would appear to be the important factors governing toxicity in bile peritonitis from sterile bile.

X-RAY SIGNS

Medical literature shows a paucity of reports of this condition, but on the basis of these cases the roentgenological signs of effusion in the lesser peritoneal sac may be listed as follows:

1. Large collections of fluid in the lesser sac may cast a direct shadow in a radiograph.

2. Expansion of a pancreatic area causing a pressure deformity on the stomach filled with air or barium, probably on the lesser curvature and posterior wall in small effusions, but the deformity is variable in degree according to the amount of effusion and the degree of filling of the stomach by the media, and is less evident in the erect posture.

3. Displacement of stomach downwards, to the left and posteriorly in large effusions, evident in lateral and antero-posterior films. Anterior displacement of the stomach should be expected, and the posterior displacement in case 2 may have been due to liver pressure.

4. The kidney outline is preserved.

5. Increased pliability and compressibility of the gastric walls on fluoroscopic palpation.

6. Chest findings similar to other subdiaphragmatic lesions, elevation of diaphragm, chiefly the left leaf, with decreased respiratory

movement; decreased radiability of lower lung fields, possible with a "strand shadow" probably from pleural transudate.

DIFFERENTIAL DIAGNOSIS

The group of signs enumerated for lesser sac effusion may be observed in any retroperitoneal cystic tumour of the upper abdomen, and the presence of any of the following conditions must be considered.

1. Retroperitoneal pseudocyst of the pancreas from abscess, hæmorrhage secondary to old pancreatitis, or degeneration of a solid tumour of the pancreas.

2. True cysts of the pancreas, rarely a hydatid, more often the retension type due to obstruction from chronic pancreatitis. These are really sacculations into the omental bursa, and the x-ray signs are often more localized than in free effusions in the sac. Cysts of the head of the pancreas enlarge the duodenal loop without displacing it forward, but lesions of the body and tail of the pancreas may simulate a lesser sac effusion, especially if large. Pancreatic cysts usually run a more chronic course with clinical evidence of pancreatic disease.

3. Primary cysts of omentum—echinococcic, dermoid, lymphogenous, traumatic serous, and hæmatogenous. These are usually localized and movable, often displacing the transverse colon, but are difficult to differentiate when situated high in the epigastrium and fixed.

4. Subdiaphragmatic or subhepatic abscesses show similar diaphragmatic changes but are commoner on the right side, often contain air, and are usually associated with elevation of temperature and more inflammatory reaction than is evident in bile peritonitis or extravasation into the sac.

5. Such retroperitoneal tumours as hæmangiomas, lymphangiomas, lipomas and even aneurysms may be difficult to rule out, but are fortunately quite rare.

SUMMARY

1. Two cases of distension of the lesser peritoneal sac by fluid are reported.

2. Lesser sac fluid collections are demonstrable by x-ray examination which should include direct studies of the chest and abdomen in both antero-posterior and lateral projections, also barium meal investigation of the upper gastro-intestinal tract, including a lateral study of the stomach.

REFERENCES

1. WANGENSTEEN, B. H.: On the significance of escape of sterile bile into the peritoneal cavity, *Ann. Surg.*, 84: 691, 1926.

2. RAVDIN, I. S., MORRISON, M. L. AND SMITH, C. M.: Bile peritonitis, *Ann. Surg.*, 89: 867, 1929.

PATHOLOGICAL MANIFESTATIONS AND ANATOMICAL VARIATIONS IN PRE-ENLISTMENT CHEST ROENTGENOGRAMS

By Major F. G. Stuart, R.C.A.M.C.

DURING a 48-week period in 1943 19,050 pre-enlistment chest roentgenographic examinations were done at Fort Osborne Military Hospital, Winnipeg, Man. The subjects were mostly male recruits between the ages of 18 and 38. A detailed record of pathological manifestations and anatomical variations was kept from day to day. Clinical correlation with x-ray findings was obtained from the records and clinicians of the Reception Centre Wing No. 10 District Depot. The collected data were analyzed and some of the highlights are reported here.

PULMONARY TUBERCULOSIS

A study was made of the distribution of the parenchymal and hilar components of healed primary type tuberculosis, otherwise known as the calcified tuberculous lesion of Ghon; 1,144 (6%) of the roentgenograms of the series showed calcification of this nature. For the purposes of this study each lung field, as seen on the postero-anterior roentgenogram, was considered to be divided into approximately upper, middle and lower thirds and hilar areas (Fig. 1A). A count was kept of the number of calcified foci found in each of these divisions for the entire series. The totals obtained were reduced to ratios of one another, taking the sum in the upper third of the left lung field as unity. Fig. 1A is a graphic representation of these figures. It will be noted that there is apparently a greater concentration of calcified foci in the lower parts of the lung fields. It was felt that this was associated with the greater width and antero-posterior depth of these regions. With this in mind a pair of lungs were obtained from a cadaver and after hardening in formalin, were cut into upper, middle and lower thirds. By means of the water displacement method, the volume of each segment was determined. The figures obtained were also reduced to ratios

as above and are graphically shown in Fig. 1B. A study of Fig. 1 indicates that the ratios of relative incidence and relative volume bear a very striking resemblance to one another. The similarity is considered to be close enough to conclude that healed primary type tuberculosis is found with equal frequency throughout all parts of both lung fields. This is in marked contrast to the re-infection type which is found to predominate in the upper thirds.

Another interesting feature in connection with healed primary type tuberculous lesions was heart. It might be noted that a parenchymal focus is generally a single calcified area. A hilar focus may contain one or more discrete areas of calcification, but for the purposes of this study they are considered to be all part of a single focus.

Primary type tuberculosis when well calcified is not generally a barrier to enlistment.

Re-infection type tuberculosis was found in 237 (1.3%) of all recruits examined. Every conceivable form from very minimal to far advanced and active was encountered. Almost

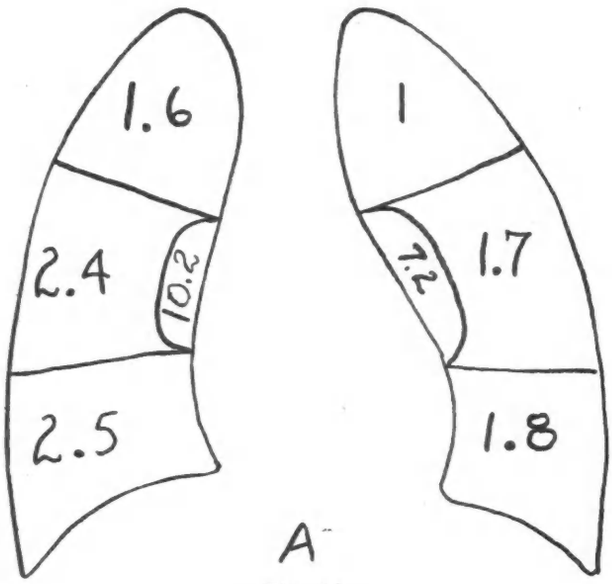
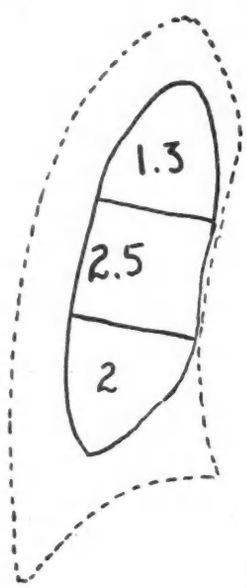


Fig. 1A



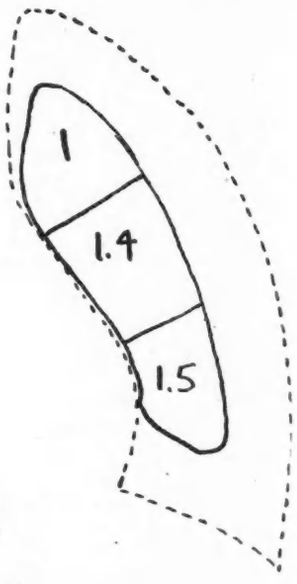


Fig. 1B

Fig. 1A.—Ratio of relative incidence of primary tuberculous calcified foci in upper, middle and lower thirds of the lung fields and hilar regions. **Fig. 1B.**—Ratio of relative volumes of lung segments corresponding to divisions in "A".

that more foci were noted in each hilum than throughout the corresponding lung fields. The ratio of hilar to parenchymal foci was 3:2. This ratio was obtained by the following calculations.

$$1.\ \frac{\text{Rt. hilar foci}}{\text{Rt. parenchymal foci}} = \frac{10.2}{1.6 + 2.4 + 2.5} = \frac{10.2}{6.5\ \text{(approx.)}} = \frac{3}{2}$$

$$2.\ \frac{\text{Lt. hilar foci}}{\text{Lt. parenchymal foci}} = \frac{7.2}{1 + 1.7 + 1.8} = \frac{7.2}{4.5\ \text{(approx.)}} = \frac{3}{2}$$

When the underlying pathology of primary type tuberculosis is borne in mind, one theoretically expects to find an approximately equal number of parenchymal and hilar calcified foci. The apparent deficiency of 1/3 of the expected parenchymal foci would suggest that many of these have resolved and left no radiographically evident trace. Undoubtedly, a small percentage of the deficiency can be accounted for by a few foci hidden behind the diaphragmatic domes or without exception the lesions were in the upper thirds of the lung fields. The distribution was as follows: 117 right upper third; 69 left upper third; and 51 bilaterally in the upper thirds. Radiographic evidence of re-infection type tuberculosis, healed or otherwise is considered cause for rejection as a general rule.

Costo-phrenic Sulcus Obliteration

Costo-phrenic sulcus obliteration or "tying of the outer angle of the diaphragm" was noted in 648 roentgenograms (3.4%) of the series. There is general agreement that in most instances this finding is of no particular clinical significance, but there is no agreement as to its etiology. For this reason an attempt was made to obtain some correlation which would clarify the situation. Probably the most significant feature of the finding is that in most cases no history of previous significant respiratory dis-

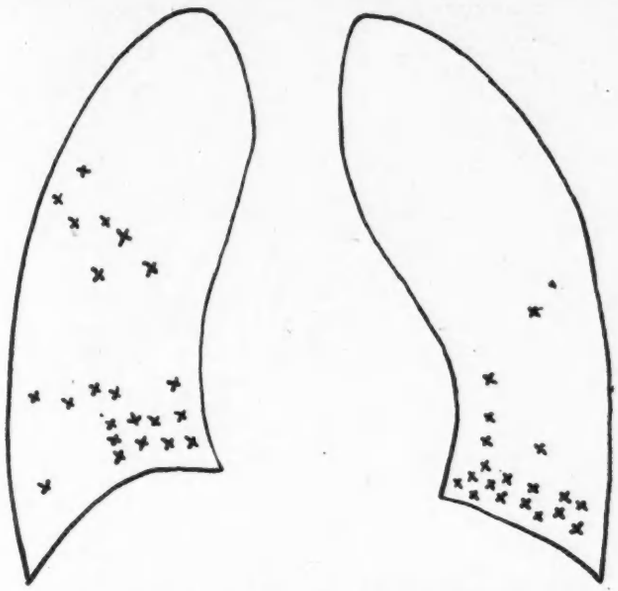


Fig. 2.—Spot diagram to demonstrate the distribution of parenchymal shadows in 42 cases of primary atypical pneumonia.

ease is elicited. In this respect it parallels the usually silent course of healed primary tuberculosis (Ghon lesion). Upon investigation along this avenue it was found that costo-phrenic sulcus obliteration occurred three-and-a-half times more frequently in the presence of a calcified primary type tuberculous lesion than in a calcium-free roentgenogram. For this reason and also because it is often definitely known to be the residuum of a "full blown" pleurisy with effusion, it is suggested that costo-phrenic sulcus obliteration is usually the result of a sub-clinical pleurisy with limited effusion (or pleuritis) of tuberculous origin. In the absence of a recent history of pleurisy with effusion or respiratory disease, it may be considered, like the healed primary tuberculous lesion to be of no clinical significance.

NON-TUBERCULOUS PULMONARY DISABILITIES

The pre-enlistment roentgenogram revealed evidence of disease in only one-third of the recruits in this series rejected for non-tuberculous pulmonary disability. This fact serves as a reminder that clinical history and physical examination play the most important part in the diagnosis. Considerable caution must be exercised in the interpretation of roentgenograms with regard to non-tuberculous pulmonary disease if mistakes, especially in the direction of over-diagnosis, are to be avoided.

In view of the current widespread interest in primary atypical pneumonia of unknown origin (so-called pneumonitis, etc.) the incidence of this syndrome in the series was determined. It was thought that the figure obtained would be a fair indication of the extent to which it exists undiagnosed among the general adult civilian population. This is because all recruits were ambulant and at the worst thought that they were suffering from "bad colds" only. Roentgen and clinical evidence of this syndrome was

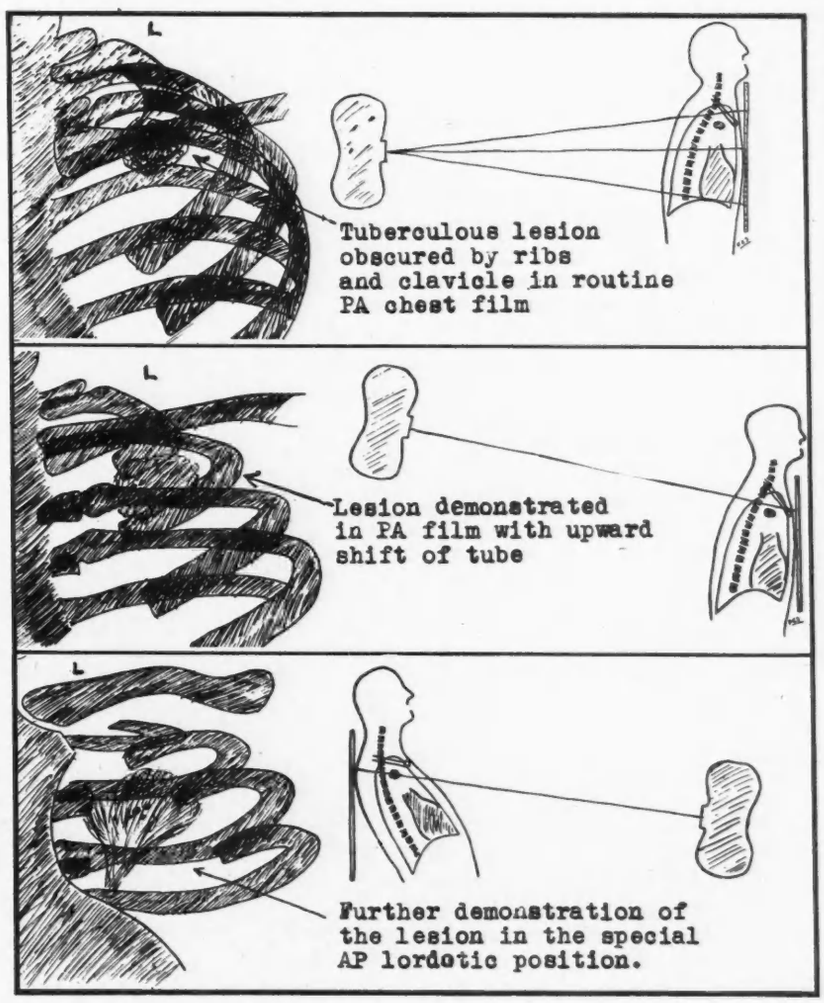

L
Tuberculous lesion obscured by ribs and clavicle in routine PA chest film
L
Lesion demonstrated in PA film with upward shift of tube
L
Further demonstration of the lesion in the special AP lordotic position.

Fig. 3.—Routine and special positions used to obtain complete visualization of the upper thirds of the lung fields.

found in 42 men (0.2%) in this series. This suggests that at least 1 in 500 of the ambulant population are daily going about with an undiagnosed acute parenchymal inflammation of the lungs. This should serve to focus attention on the advisability of a change in the management of persistent acute upper respiratory infections with a view to lowering the present high incidence of chronic respiratory disease. It is assumed that insufficient treatment of the former may underlie the development of the latter. A more enlightened management is coming into practice, especially in the armed services, but the above-mentioned incidence indicates that many individuals are still going about insufficiently treated.

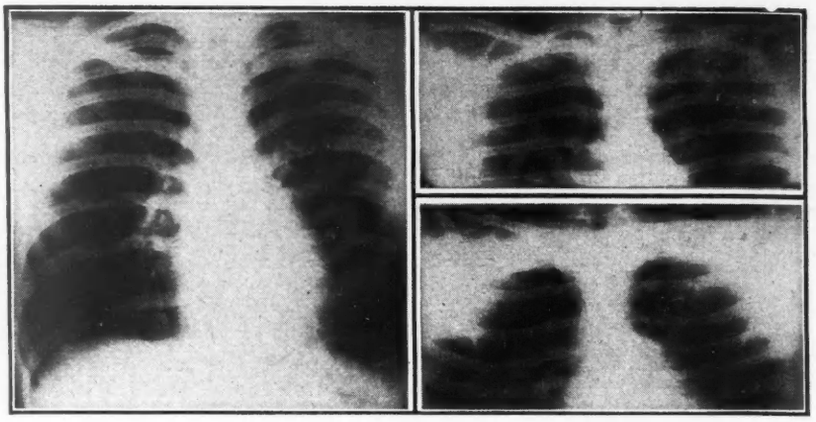


Fig. 4A Fig. 4B

Fig. 4A.—Routine P.A. pre-enlistment chest roentgenogram. Note suspicious shadow obscured by 1st left rib and clavicle.

Fig. 4B.—Special P.A. view with upward shift of tube (above) and A.P. lordotic view (below). Note the clearly demonstrated tuberculous lesion situated approximately in the anterior half of the left apex.

No definite correlation between season and incidence of this syndrome could be established. Probably the number of cases (42) was too small.

Fig. 2 illustrates diagrammatically the distribution of the primary atypical pneumonic lesions encountered in this series. It will be noted that it generally occurs in the bases of lobes. Some of the cases occurring in the base of the right upper lobe were difficult to differentiate from tuberculosis. Clinical observation and repeated roentgen examination usually served to make the diagnosis clear in 2 or 3 weeks.

The Cardio-thoracic Ratio as an Index of Cardiac Disability

Determination of the cardio-thoracic ratio (widest transverse diameter of heart to widest inside diameter of the bony thorax) is part of the pre-enlistment roentgen examination. It is generally agreed that a ratio of 1:2 or 50% or over is suggestive of cardiac disease. A survey was made in the series to determine to what extent this was so amongst men of army age. The following table indicates how rapidly the incidence of cardiac disability rises when the cardio-thoracic ratio is 50% or greater.

	No. of cases	*No. of cardiac disabilities**	*Percentage*
Group I			
C-T ratio 50% or over..	159	76	48.0
Group II			
C-T ratio under 50%...	18,891	266	1.4

* Pure hypertensives were excluded.

A person in Group I is 34 times more liable to have a cardiac disability than a person in Group II. If the C-T ratio is 50% or greater the chances of a cardiac disability are 1 in 2, whereas if it is under 50% the chances are 1 in 70.

Apparent alterations in cardiac contour vary considerably in their significance and must be closely correlated with clinical findings before a disability can be diagnosed.

Congenital Anomalies

Cardiac anomalies			
Dextra-cardia	4	(0.02%)	1 in 4,762
Diaphragmatic anomalies			
Polyarcuate or undulating diaphragms (mostly on right side)	21	(0.1%)	1 in 907
Eventrated left diaphragm	2	(0.01%)	1 in 9,525
Anomalies of lobes			
Azygos lobe	77	(0.4%)	1 in 245
Rib anomalies			
Cervical rib (referable symptoms were very rare)	74	(0.38%)	1 in 257
Rudimentary or underdeveloped 1st rib	44	(0.23%)	1 in 432
Bifurcated or flaring of anterior ends of ribs	140	(0.74%)	1 in 136
Fusion or bridging between ribs:			
Anterior halves of 1st, 2nd, 3rd	43	(0.23%)	1 in 443
Posterior halves of 5th, 6th, 7th	16	(0.08%)	1 in 1,190
Pseudarthrosis or segmentation of 1st rib	13	(0.07%)	1 in 1,465
Articulating facets between anterior halves of adjacent 1st and 2nd ribs	13	(0.07%)	1 in 1,465
Total rib anomalies	343	(1.9%)	1 in 55

The Technical Approach to an Adequate Chest Roentgenographic Examination

It is generally recognized that the primary objective of routine pre-enlistment roentgenography of the chest is the detection of tuberculosis. It is therefore essential that a good visualization of the upper lung fields be obtained. This is usually achieved in the standard

postero-anterior position. But instances are occasionally encountered where this is not so. In other cases suspicious apical shadows may be seen but their nature is obscured by overlying bone or soft tissues. To resort to "guessing" or appeal to "opinion" in the interpretation of the roentgenograms in such cases is evading responsibility. Clinical investigation may be essentially negative and therefore of no aid in the diagnosis.

With these considerations in mind a special positioning technique was adopted to provide the maximum in x-ray information in such cases. The diagrams in Fig. 3 illustrate how complete visualization of the upper lung fields is accomplished. In the antero-posterior lordotic position the primary beam is projected parallel to the plane of the upper surface of the first rib. The required angulation of the tube is determined by palpation and inspection of the upper thorax of each individual. As this requires only half a 14" x 17" film, the remainder is used for a postero-anterior view with the beam angulated downwards. Study of the latter view in conjunction with the original routine roentgenogram permits of a rough localization of a shadow by the parallax method, *i.e.*, the extent of the shift of the shadow will vary in the two views in direct proportion to its proximity to the film.

The extensive information obtained and the economy of film recommend this method in preference to making standard stereoscopic films, either routinely or in suspicious cases.

In numerous questionable cases suspicion has been confirmed or removed beyond any doubt by the use of this technique. See Fig. 4.

The above principles have been also applied to visualize the lower and mid lung fields to better advantage. In such cases an oblique view replaces the antero-posterior lordotic position.

SUMMARY

In a series of 19,050 pre-enlistment roentgenograms the following observations were made:

1. Healed primary tuberculosis was found with equal frequency throughout all parts of both lungs. Re-infection type tuberculosis was found to be predominantly apical.

2. The parenchymal components of the primary tuberculous lesion showed a 30% greater tendency to complete radiographic resolution than did the hilar components.

3. Costo-phrenic sulcus obliteration was regarded as being most often of primary tuberculous origin.

4. At least 0.2% of the adult population (1 in 500) have radiographically evident lung parenchymal lesions of which they are not aware, associated with acute upper respiratory infections.

5. Where the cardio-thoracic ratio was 50% or over there was an even chance of cardiac disability being present.

6. The frequency of various thoracic congenital anomalies was noted.

7. The technical aspects in chest roentgenology are of major importance. A supplementary technique of examination of the lung apices is described.

POSTOPERATIVE SURVIVAL PERIODS IN GASTRO-INTESTINAL CARCINOMATA*

By Lyon H. Appleby, F.R.C.S.(Eng.), F.R.C.S.[C.], F.A.C.S.

Vancouver

I AM quite convinced that the average busy surgeon has no mathematically accurate knowledge of the end results over a period of years, of his operations for carcinoma. Time usually does not permit extensive follow-up investigations. Published series of cases from various clinics have always left me wondering when I should have leisure sufficient to pursue such an investigation. An accident in the early part of 1943 forced many months of leisure time upon me, and the figures herewith are as a result of about a year's research of some 20 years' endeavour.

Carcinoma of the rectum records reveal a total of 308 cases. References to Table I hereunder will show that I have explored surgically about two-thirds of these cases. This "exploration rate" is lower than in any other section of the large bowel. I have in these cases been able to resect with a prospect of cure in 40.2% of cases or 25.3% of the entire group. In other words about 75% of these cases, while various palliative procedures may have been carried out, were beyond prospect of surgical cure. In the

* Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Surgery, Toronto, Ont., May 25, 1944.

absence of obstruction, I have always subscribed to the "one stage resection" in preference to "multiple stage operations" where at all possible. Operative mortality has run about 11%.

TABLE I.

Carcinoma of rectum	308	
Exploration	204	66.2%
Abdomino-perineal resections	92/204	45.0%
Palliative operations	102/204	50.0%
Rejected	10	5.0%
One stage resections	67	
Multiple stage resections	25	
Operative mortality, one stage	7/67	10.4%
Operative mortality, multiple stage	3/25	12.0%
Prospect of cure of total	82/308	25.3%
Prospect of cure of operations	82/204	40.2%

It will be noted that 82 cases out of a total of 308 left hospital with a reasonable prospect of a surgical cure. What subsequently happened to them is contained in Table II.

TABLE II.

Carcinoma of rectum	308	
Prospect of cure survivals	82	
Traced	66	
Known survivors	38	57.5%
Five years or over	21	31.8%

Twenty-one out of these 82 have survived 5 years, *i.e.*, 31.8%, but actually 57.5% are still alive, a great many of whom have been operated upon within the last five years, and of whom a fairly large group will undoubtedly reach the five-year standard. Several in this group are alive 10 years, and one of them has survived 14 years, and is in good health.

CARCINOMA OF THE SIGMOID

I have had 327 cases of carcinoma of the sigmoid and I find my exploration rate has jumped from 66.2% in the rectum, to 90% in the sigmoid. I think this is a natural result of the measure of doubt which must surround any internal carcinoma. Reference to Table III will show that 63.5% of these cases were actually obstructed when first seen. It is an index of the difficulty of diagnosis of pre-obstruction intestinal carcinoma. In all cases of obstruction some form of deflation procedure was always carried out prior to subsequent resection. Such might be cæcostomy, appendicostomy, transverse colostomy, or some form of "Devine" type of exclusion. All resection cases were fortified by some similar procedure, usually cæcostomy.

In the absence of dissemination, the degree of local fixity of sigmoidal carcinomata should not deceive the surgeon as to its subsequent resectability. Two or three weeks after deflation the grossly adherent mass may be much more mobile, and readily removable due to the subsidence of coincident inflammatory change. I have recently had several cases in which cæcostomy plus penicillin has liberated in an astonishing way the inflammatory grip in which the carcinoma had been held.

Of the 296 cases explored 107 were resected with a "prospect of cure" or 36.1%, with an operative mortality of 6.5%. This however represents the mortality after obstruction had been overcome. The total operative mortality including relief of obstruction was 22.3%.

TABLE III.

Carcinoma of sigmoid	327	
Explored	296/327	90.0%
Obstructed cases	188/296	63.5%
Total resections	159	
Prospect of cure	107	68.0%
Palliative resections	52	32.0%
Curative resections	107/296	36.1%
Operative mortality	7/107	6.5%
Total operative mortality including obstructions	66/296	22.3%
Prospect of cure	100/296	33.8%

Out of these 100 cases who survived and left hospital with a prospect of cure, 54% are still alive, and 34% are alive five years or more, many of them much more.

TABLE IV.
CARCINOMA OF SIGMOID

Operations	296	
Resection survivors	100	
Traced	87	
Alive	54/100	54.0%
Alive 5 years	34/100	34.0%

In carcinoma of the transverse colon, and the descending colon again the "exploration rate" is high 95% with a total of 81 cases. On the whole however my results here have been less satisfactory than in the sigmoid; moreover the mortality rate here has been 12.2%, a much higher percentage of transverse colon cases presented themselves prior to obstruction. Five year cures have dropped from 34% in the sigmoid to 25% in the transverse and descending colon.

TABLE V.
CARCINOMA OF THE TRANSVERSE AND DESCENDING COLON

Cases	81	
Explored	77/81	95.0%
Total resections	59	
Palliative operations	18	
Prospect of cure resections	41/81	53.2%
Operative mortality	5/41	12.2%
Resection survivors	36	
Traced	30	
Known survivors	16/36	44.4%
Five years or more	9/36	25.0%

I have had rather an astonishing series of cases of carcinoma involving the cæcum and ascending colon. In the first place I believe

that viewed in relation to the total number of intestinal carcinomata, I have had a larger number in this particular site than should be my share. In addition I think my results have been exceptional. Out of 59 cases explored, I have been able to resect with a "prospect of cure" 44 of them or 74.5%. The astonishing feature is that these 44 right-sided resections for carcinoma have been carried through without operative mortality, and of these 44 cases, 31 are known to be alive, *i.e.*, 70%. Of these, 24 are alive 5 years or more, 54.5%. This is about the same five-year survival rate as is to be found in an equal number of healthy people in the same age groups over a similar period of time.

TABLE VI.

CARCINOMA OF CÆCUM AND ASCENDING COLON

Total cases	62	
Explored	59/62	95.1%
Palliative operations	15/59	24.4%
Prospect of cure resections	44/59	74.5%
Operative mortality	0	00.0%
Resection survivors	44	
Traced	40	
Known survivors	31/44	70.0%
Five years or more	24/44	54.5%

I have had but six cases of primary carcinomata of the small bowel, three in the fixed third or transverse part of the duodenum, and three in the mobile segments of the small gut; all were explored. The first three in the transverse portion of the duodenum were treated by palliative short-circuit. The three in the mobile section by resection, of whom two are alive, one of them six years, and the other seventeen months. This series does not include cases of carcinomata of the ampulla of Vater.

TABLE VII.

Carcinoma of small bowel	6	
Third part of duodenum	3	
Mobile small bowel	3	
Explored	6	100.0%
Palliative gastro-enterostomy	3	
Small bowel resections (prospect of cure)	3/6	50.0%
Traced—all	3	
Alive	2	66.6%
Five-year cures	1	33.3%
Operative mortality	Nil	

I have suffered some criticism from my fellow surgeons because of my attitude towards carcinoma of the stomach. My results in this condition down through the years have been so consistently bad that I publish the figures with a sense of dismay.

I have records of 684 cases of carcinoma of the stomach, yet of these, I have explored only 193 or 28.2%, a drop in my exploration rate for other gastro-intestinal carcinoma from 95%. I have found in so very many instances—491 out of 684 to be exact—evidence of dissemination, supraclavicular nodes, hepatic nodules, rectal shelves, ascites, fixed immovable masses, grave emaciation, severe anæmias, etc., that I have rejected these cases as offering no possible prospect of cure. In obstructive cases with vomiting, etc., I have always explored and performed some palliative short circuit regardless of gross disseminations. I must say, however, that such palliative procedures, short of palliative gastric resection, have in my hands left very much to be desired.

My failure to explore so many of these cases has resulted in considerable criticism, many of those rejected have gone elsewhere, and been explored. As I have watched through the years these cases being resected in the presence of widespread dissemination, suffering a 25% operative mortality, for the sake of a very few months, most of which is frequently spent in hospital, I have been overcome by a sense of utter futility. Not that I feel palliative resection has not a very useful place, particularly in distal end cases, but in the average case of carcinoma of the stomach, a contemplation of the carcinoma that remains after the resection, has in most instances deterred me.

In my series of cases I have been able to resect with a "prospect of cure" 31 cases out of 193 I have explored, or 16%. But this is only 31 cases out of 684 cases I have seen, or a percentage of 4.5 of the whole.

TABLE VIII.

CARCINOMA OF STOMACH

Cases	684	
Explored	193	28.2%
Rejected	491	71.8%
Palliative operations	54/193	28.0%
Palliative resections	31/193	16.0%
Curative resections:		
(*a*) Of explored cases	31/193	16.0%
(*b*) Of total cases	31/684	4.5%

Of these 31 resections, 24 survived, an operative mortality rate of 22.5%. In other words 24 cases out of 193 I have explored, or 24 cases out of 684 cases I have seen, have left hospital with a "prospect of cure", *i.e.*, 3.8%.

TABLE IX.

CARCINOMA OF STOMACH

Total cases	684	
Prospect of cure resections	31	4.5%
Subtotal gastrectomy	28	
Total gastrectomy	3	
Operative mortality	7/31	22.5%
Prospect of cure:		
(*a*) Of operated cases	24/193	12.4%
(*b*) Of total	24/684	3.8%

Of these 24 survivors of gastric resection with a "prospect of cure" what happened to them is contained in Table X hereunder. Comment is superfluous.

In connection with carcinomata of the stomach, I wish to point out that any operation, even exploration, is dangerous. Simple exploration and closure has in 77 cases carried a mortality rate of 5.2%, ranging up to 25.1% for palliative gastric resection.

TABLE X.

Carcinoma of stomach	684
Resection survivals	24
Traced	22
Dead	19
Alive	3
Survivors in months	11.6.4
Longest survival—months	18
Average survival—months	8½

Mortality, 193 operations.

	Cases	*Deaths*	*%*
Exploration only	77	4	5.2
Palliative operations	54	7	13.0
Palliative resections	31	8	25.1
Prospect of cure operations	31	7	22.5
All operations			13.4

The fact that malignant cases will not stand surgery to anything like the same extent as non-malignant cases is shown in Table XI where resection of the stomach for cancer and for ulcer or other non-malignant lesion is compared. My mortality rate for resections of the stomach for cancer is 24.2%, while I can now report 293 consecutive gastric resections for ulcer or other non-malignant lesion with a mortality rate of only 3.1%. I am also able to present herewith a consecutive series of 113 resections for ulcer without mortality. If the mortality rates for cancer resections on the one hand can be so high, and on the other can be so low for similar resections for ulcer, in the hands of the same surgeon; then the difference in mortality rates is intrinsic to the disease, and not to the surgeon.

TABLE XI.

COMPARISON WITH ULCER CASES

	Cases	*Deaths*	*%*
Resection for cancer	62	15	24.2
Resection for ulcer or other than cancer	293	9	3.1
Successive resections for ulcer without mortality	113		

Surgery for gastric carcinoma has in my hands provided some relief from pain and distress, but through the years no cures. But if we leave out gastric carcinomata and study the results of operations for other intestinal carcinomata, we have very good reason to be gratified with what has been accomplished. My series reveals that in the aggregate 287 cases of intestinal resection for carcinoma have been carried out with an 8% mortality rate, and 31% five year cures. As more than a third of these cases have been done in the past five years this latter figure ultimately should be materially increased. These 287 resections were gleaned from 764 cases operated upon, *i.e.*, 36.6%.

TABLE XII.

	Cases resected	*Mortality*	*Present survivors*	*5 year survivors*
Abdomino-perineals	92	10	38	21
Sigmoid	107	7	54	34
Tranverse colon	41	5	16	9
Cæcum and ascending colon	44	0	31	24
Small Bowel	3	0	2	1
	287	22	141	89
Percentages		8.0	49.1	31.0

Prospect of cure resections, 287/784 cases, 36.6%

Now I am able to answer fairly accurately the obvious question of the patient. What chance have I got? If you have a carcinoma of your intestinal tract exclusive of the stomach, you have a 36.6% chance of having it removed with a "prospect of cure". If it is removed you have a 92% chance of recovery and a 31% chance of being alive in five years. There is little indeed in these figures to inspire a feeling of despair.

EXPERIENCES WITH PENTOTHAL DURING THE FIRST 100 DAYS FOLLOWING THE NORMANDY INVASION

By Major George A. Wainwright, R.C.A.M.C.

THE heavy influx of casualties immediately following the invasion of Normandy justified the belief that in pentothal we had an agent which would enable the anæsthetist to cope with such large numbers of surgical cases. Without it, anæsthetic delays would have been inevitable.

No. 4 Canadian General Hospital, with a normal capacity of 600 beds, functioned during this first 100 days following the Normandy invasion as a C.C.S. rather than as a static base hospital. Only those cases requiring urgent surgery could be dealt with during those strenuous days. During this period 2,203 cases were operated on and pentothal was the anæsthetic agent employed in 1,887, a percentage of 86.3.

Of these 1,887 cases it was used as a single agent in 1,790, and in combination with other agents in 97.

Records were kept of the general condition of the patient, the type and duration of the operation, the amount of pentothal used, and the recovery time. The recovery time was gauged in the wards by the return of the swallowing reflex and by movement; a rather crude criterion, but the only one feasible under conditions when close individual recovery supervision was impossible.

The limited instruction and surveillance of part-time anæsthetic assistants bespeak a greater margin of safety with this drug than we previously thought it possessed. This virtue may have been enhanced by the routine use of intranasal oxygen and the liberal use of whole blood serum or glucose-saline intravenously. Two grams of pentothal was decided upon as the maximum dose to be used and this was rarely exceeded. Resuscitation measures were first carried out in all cases showing a systolic blood pressure below 90 or a hæmoglobin of less than 75.

PROCEDURE AND GENERAL OBSERVATIONS

Preoperative technique had to be standardized rather than individualized. Routinely, morphine gr. 1/6, and atropine gr. 1/150 were given 45 minutes before operation. If the crowded schedule necessitated a delay of 1½ hours, the hypo was repeated. Atropine particularly seemed to make a great difference in the course of the anæsthetic, both in the smoothness and the amount of pentothal required. If for any reason the patient reached the operating theatre without having been given "M. and A.", the same dose was given intravenously immediately prior to surgery, usually with gratifying results. Nembutal was avoided. No food was allowed for four hours prior to operation. We found the 5% solution more satisfactory than the 2½%. Induction was carried out in the routine manner, using the median basilic vein as the site for venupuncture when it was available.

In short cases a flexible rubber adapter about eight inches in length was inserted between the needle and the syringe. The tube was held in place by transverse adhesive strips. This considerably reduced the danger of the needle being dislodged from the vein, and also enabled the anæsthetist to inject the solution from any position. In prolonged cases the drip method using a ½% solution was employed. The introduction of a three-way stop-cock enabled us to run saline, blood or plasma intermittently and 5% pentothal could be injected directly if the patient became light. An endotracheal tube was introduced in these cases and oxygen administered directly from the Heidbrink machine. If the operation was not complete when the 2 gm. of pentothal had been used, the switch to cyclopropane or nitrous oxide and oxygen was effected with no disturbance to the course of the anæsthetic. Drip pentothal lends itself admirably to the introduction of a Magill tube.

The difference in the tolerance for pentothal on the part of individuals in the same age group and all showing some degree of shock and exhaustion was most striking. No evident explanation was apparent for this. After venupuncture the patient was instructed to count aloud slowly while the pentothal was being introduced. The injection was temporarily suspended at the point at which the voice became blurred, subsequent to which loss of consciousness was almost immediate. In some cases, 0.4 or 0.5 gm. produced this blurring whereas in others 1.5 gm. and in one case 2 gm. left enunciation unimpaired. The recovery period was usually prolonged in those cases requiring greater amounts for induction, irrespective of the total amount of pentothal required for the procedure.

As pentothal is a respiratory depressant, respiratory changes were closely observed. A "butterfly" attached to the airway facilitated detection of change when the excursion was shallow. (The breathing is first thoracic, then thoraco-abdominal, then abdominal when the patient is quite deep. During recovery and lightening, the sequence is reversed.) The depth of the anæsthetic was gauged by the type of respiration.

Eye reflexes were found to be of little value early in determining the depth of anæsthesia. There appear to be no "planes of anæsthesia" as we used to try to gauge with inhalation anæsthetics. Transition from light to deep and vice versa may be very rapid, particularly early in the anæsthetic. This proved very noticeable in shock cases and this abrupt change required close supervision.

One foot was usually left exposed. In most cases if the anæsthesia became light, dorsiflexion of the foot indicated the fact before other movement was evident.

Operations on the genitalia, face, feet and hands required greater amounts of pentothal than other sites. No throat or neck procedures were carried out under this agent because of the danger of carotid sinus stimulation.

The great stimulus from skin incision and suturing has long been recognized. Some restraint of the arm or leg while the initial incision was being made was found to reduce definitely the amount of pentothal required when an extensive debridement was to be done.

Shock and exhaustion cases tolerated the drug much better than we anticipated. Our observation was that they required much less pentothal although their recovery period was more prolonged. Induction with these cases was usually quiet, but they were more excitable during the recovery phase.

Emotional upset seemed to have a direct bearing on the course of the anæsthetic, pertaining to the recovery period. We noted that the prisoners of war, while usually undergoing induction quietly and co-operatively were often noisy, excitable and highly emotional during the stage of recovery. This emotional upset very often persisted for some hours and was a source of concern because of the disturbance to the rest of the ward. Investigation revealed that these men believed they were to be executed when taken to the operating room. They had been assured that if they were taken prisoners they would be killed, even in our hospitals. With many of the early cases, this fear was aggravated by the sight of the syringe, as this instrument had been utilized in many of their "mercy killings". Further, two German medical officers who came to us as prisoners, told us that intravenous anæsthesia was used very little in the German army. The fear of the subsequent prisoners of war was of course considerably allayed by the safe return of their comrades. We felt that the apprehension experienced by these men was responsible for the marked difference in the manner of recovery, rather than any difference in racial characteristics.

Difficulties Arising

One of the difficulties encountered in this series was the plugging of the needle in the vein. This was particularly consistent in cases in which the lateral position was employed and the dependent arm was used for the venupuncture. The venous back-pressure was considerably increased and clotting was the rule rather than the exception. To offset this we tried 2½% sodium citrate solution as the diluent for the pentothal rather than the usual sterile distilled water. While clotting still occurred to some extent, it was appreciably diminished. Further, smaller gauge needles could be used with less discomfort to the patient. No untoward reactions were experienced which could be attributed to the use of the citrate solution.

In many cases both in the lateral and flat positions the contents of the syringe were very markedly diluted with blood due to venous back-pressure. This was offset by attaching a U-shaped strip of adhesive from one side of the syringe over the end of the piston and fastened to the opposite side of the syringe. Releasing one end of the "U" allowed further introduction of the solution and the strip readily reattached further down on that side of the barrel.

Our experience was that the Cambridge table did not lend itself well to the use of pentothal. This was particularly true of cases requiring the application of thoraco-brachial splints. The lack of support for the thorax seemed to be responsible for a marked tendency for respiratory depression to occur. We now employ open-mask ether, which we found more suitable for this type of case than any other anæsthetic agent.

Similarly, the use of the prone position caused respiratory difficulty in many cases if pentothal was used. We experimented with various types of chest support. A small hard pillow placed well down under the lower thorax with a small sandbag supporting the chin facilitated the course of the anæsthetic to some extent. A more rapid rate of injection of the pentothal enabled the patient to tolerate an airway earlier and thus maintain unobstructed breathing. But other difficulties were encountered in this position. Although ordinarily there is little tendency for vomiting to occur with pentothal, it was our experience that this did not pertain if the prone position had to be used. We encountered vomiting in this position so frequently that we resorted to gastric lavage if food had been ingested within four hours. However, we have now discarded the use of pentothal in these cases in favour of intubation under cyclopropane.

If respiratory depression occurred during the course of the anæsthetic we always anticipated a recurrence after the patient's return to the ward. The reason for this was not apparent for it did not appear to be dependent on the

amount of pentothal used or the rate of injection. This secondary respiratory depression phase did not always occur but it did so in a sufficient number of cases to warrant special precautions being taken. Resuscitation facilities were allocated to these cases when they were moved from the operating theatre to the ward.

In this series of 1,887 cases no fatalities occurred which could be attributed to the anæsthetic, although five cases caused us considerable concern. All five occurred in cases necessitating the prone position. Three of them had been inadvertently fed shortly before coming to the operating room and vomiting occurred in all three. One other appeared to be a definite respiratory depression which occurred first on the table and later in the ward. The other patient took food himself unknown to any of the staff just prior to operation. He choked 20 minutes after his return to the ward. Cessation of breathing with marked cyanosis occurred. When a laryngoscope was passed, a piece of food was found lodged between the arytenoids. Its removal was followed by complete recovery. It was felt the only factor contributed by the prone position in this case was the increased tendency to vomit.

Rapid evacuation of casualties precluded a follow-up to observe anæsthetic complications postoperatively. No pulmonary mishaps occurred in this series before their departure.

It was formerly believed that pentothal should not be used if sulfonamides had been administered. Most of our cases had received varying amounts of sulfathiazole before reaching us. No untoward effects following the injection of pentothal were noted, even when large doses of the sulfathiazole had been given.

One obscure case of laryngospasm was of interest. The patient had sustained a badly fractured clavicle necessitating the introduction of a Kirschner wire to maintain alignment. Following the operation, a Velpeau bandage was used for support. With the resultant pressure on the opposite side of the neck, laryngospasm occurred. There was no mechanical obstruction from the bandage yet the spasm recurred each time the Velpeau bandage was applied, and was relieved when it was disengaged. Fixation of the elbow by sandbags permitted uneventful recovery from the anæsthetic after which the bandage was replaced with no untoward effects. It is interesting to speculate on the mechanism involved in producing this reaction, whether or not carotid sinus stimulation was the causative factor.

Reactions similar to, although milder than, ether convulsions have long been recognized with pentothal. We experienced a number of such reactions, usually late in the operation or after return to the ward. They varied in degree from mild shivering to rather severe jactitation. Their incidence was reduced when the heating facilities in the theatres were improved, and they may well have been thermal in origin.

RESUSCITATION MEASURES

Suction, oxygen tanks and oral B.L.B. masks were scattered throughout the hospital in the most accessible locations. Nursing sisters and orderlies were instructed in their use. In cases of respiratory depression, a laryngoscope was first passed to make sure the airway was patent. This was ensured by the introduction of a Magill tube. The tube was attached directly to the Heidbrink machine if it was available. A carbon dioxide and oxygen mixture was run into the bag and artificial respiration carried out by compression of the bag. Three cases required artificial respiration on the wards. This was carried out by the Schaeffer method with direct flow from the oxygen tank passed directly into the endotracheal tube under low pressure. The use of larger doses of coramine than we formerly employed, given intravenously, firmly convinced us of the efficacy of this agent. Four or five c.c. were given directly into the vein in severe cases. We did not have to resort to tracheotomy or cardiac massage in any of our cases.

Stimulus to the use of pentothal as an anæsthetic agent in civilian practice is inevitable as a result of its use in war surgery. Of two things I am firmly convinced; first, that there will be a greater demand for it, because surgeons have been pleased with the results attending its use. They have been impressed with its speed and safety and feel that it has fewer limitations than we formerly believed. Patients are enthusiastic about it and ask for it by name if subsequent operative procedures are necessary. Secondly, it will be much more widely used as an induction agent because of its easy and pleasant administration and the smooth transition to the maintenance of anæsthesia.

As one of our surgeons said at the conclusion of a series of trying cases, "Often as I have seen it used, I still marvel at the speed and efficiency of intravenous pentothal. We could never get

through the work we do without it''. High tribute to a very valuable war anæsthetic.

SUMMARY

1. An analysis of 1,887 cases in which pentothal was used in the first 100 days after the invasion of Normandy in a Canadian base hospital is made.

2. Technique and observations on the course of the anæsthetic are discussed.

3. Reference is made to some of the difficulties encountered and the steps taken to offset them.

4. A discussion of the mishaps occurring and their prevention and treatment is given.

THE USE AND ABUSE OF VITAMINS*

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THE medical profession finds itself in a dilemma about vitamins. On the one hand we must emphasize the importance of vitamins in the maintenance of health and strength. In this connection it is necessary to say that the only way of providing a full vitamin intake is by means of an adequate diet. This is true for many reasons: firstly, because we do not know any chemical diet that will give as good results as one formed of natural foods, so there must be many factors yet undiscovered; secondly, many of the vitamins that are available in concentrated form are too expensive to provide in other than food; thirdly, people get tired or careless about taking pills, while they must always continue to eat foods. Naturally we must also maintain the necessity of vitamin therapy in the treatment of deficiency states, especially when severe. Then too we must recognize that even on an apparently adequate diet some people are in need of extra vitamins for special reasons.

On the other hand, as Ruffin[1] has said, ''It is a physician's personal responsibility to prevent his patients from becoming victims of needless and expensive vitamin therapy, and to point out that vitamins are not a panacea for all human ills''. This responsibility is not an easy one because many of us, for a while at least, followed and did research on vitamins with the feeling that now at last we were approaching something fundamental. We now know that there is much yet to be learned. This exaggeration of the importance of vitamins is carefully kept alive among both lay people and the medical profession by interested groups, though even now it is possible to detect a distinct settling of the early enthusiasm into more careful clinical evaluations.

There are really only a few clear indications for the use of vitamins in concentrated form, and this paper reviews them briefly. Any use of vitamins without a clear indication must be considered an abuse. Furthermore, I consider that any use of vitamins without careful attention to the support of an adequate diet is an abuse, because no vitamin preparation can replace an adequate diet in full restoration and ultimate maintenance of the patient in good health. In the absence of organic disease, the individual who consumes a diet, adequate in calories, and consisting of reasonable quantities of milk, fruits, green vegetables, cereals, meat and eggs, does not need additional vitamins. Furthermore, a diet of this sort will greatly improve the response to any vitamin therapy that is needed.

CANADA'S FOOD RULES

APPROVED BY THE CANADIAN COUNCIL ON NUTRITION 1944

These are the foods for health.
Eat them every day. Drink plenty of water.

1. *Milk.*—Adults, ½ to 1 pint. Children 1½ pints to 1 quart.
2. *Fruit.*—One serving of citrus fruit or tomatoes or their juices; and one serving of other fruit.
3. *Vegetables.*—At least one serving of potatoes; at least two servings of other vegetables, preferably leafy, green or yellow, and frequently raw.
4. *Cereals and bread.*—One serving of a whole-grain cereal and at least four slices of Canada Approved Vitamin B bread (whole wheat, brown or white), with butter.
5. *Meat and fish.*—One serving of meat, fish, poultry or meat alternates such as beans, peas, nuts, eggs or cheese. Also use eggs and cheese at least three times a week each, liver frequently.

A fish liver oil, as a source of vitamin D, should be given to children and expectant mothers, and may be advisable for other adults.
Iodized salt is recommended.

What then are the conditions under which we have clear indications for the use of vitamin concentrates?

CAUSES OF DEFICIENCIES

One has only to remember the four stages involved in assimilating vitamins to outline the

* A paper delivered to the Porcupine District Medical Society, in Timmins, February 24, 1945.

causes of deficiencies of vitamins. These four stages are (1) the intake or diet; (2) the absorption or what goes on in the gastrointestinal tract; (3) the blood levels of vitamins and possible demands for high blood levels, and (4) finally the ultimate fate or excretion of vitamins.

The intake of food vitamins may be below the normal or optimal range due to poverty, fads, ignorance, psychopathic conditions, lack of interest, old age, and the use of special diets such as for infants or for therapy. Severe deficiencies, which may be either acute or chronic, of the classical type such as scurvy, pellagra or beri-beri, are commonly found in this group. They result especially from poverty, fads, ignorance and indifference. No one would question the use of synthetic vitamins to supplement a good diet in treating severe deficiencies. Rarely can you see more spectacular recoveries of health in people almost moribund. Such deficiencies are rare in Canada.[2]

A somewhat milder type of deficiency is usually found with an inadequate intake of food vitamins resulting from special therapeutic diets for infants. Even in old age mild deficiency may develop due to loss of teeth, fixed food habits and lack of variety.

Again it must be emphasized that correction of any mild vitamin deficiency demands the establishment of a sound dietary regimen based on the needs of the individual according to age, sex, activity, etc. But here again supplementation with vitamin concentrates is often useful.

Gratifying response is frequently found to mild deficiencies of the B-vitamins particularly, which may be diagnosed by the general malaise and extreme lack of appetite together with the sore and fissured tongue and fissured mouth corners.

ABUSES

On the other hand it is in this field of mild (and potential) vitamin deficiencies that the grossest abuse of vitamins is now occurring. This abuse is by the manufacturers, the public and the medical profession. Vague symptoms have been ascribed to mild vitamin deficiency such as weakness, fatigability, insomnia and irritability. When results are not achieved by reasonable dosage for a short time, it is claimed that therapy must be continued for years in order to be effective and with dosages 10 or 50 times the day's allowances. Such a claim is, of course, difficult to prove or disprove since many other changes occur in such a long time. The best attitude at present is that, in the absence of other evidence of organic disease, such vague symptoms should not be considered evidence of vitamin deficiency, nor should a therapeutic test be continued many weeks if there is no evidence of improvement.

FORTIFICATION OF FOODS

The possibilities of such mild or potential deficiencies being widespread among the public is capable of another abuse of synthetic vitamins, namely the addition of such vitamins to foods. Of the vitamins we know very few can be manufactured as cheaply as they can be produced in foods, nor do we know how to add back all the nutrients lost in the processing and refining of foods. To add two or three vitamins or minerals in pretense of restoring the value of natural foods which have been debased by careless storage, processing and preparation might prove an expensive boomerang.[3] Efforts would still be needed to educate the public in the advantages of an adequate diet in order to avoid the suggestion that the work of the farmer and fisherman can be replaced with the chemist's tar barrel. If such education of the public is carried out, then the need for adding synthetic vitamins to foods disappears, except for emergencies and for purposes of therapy.

So much for inadequate intakes of food vitamins.

ABSORPTION

Absorption is the next step in assimilation, and here many conditions may produce deficiencies of vitamins even on an apparently adequate diet. They are relatively uncommon, however.

1. *The intestinal bacteria* are frequently neglected in considering what nutrients are actually available for absorption, but they are quite important. It is known that vitamins A and C can be destroyed in the intestines and this may account at times for vitamin deficiencies. This would be more likely after a special diet has been in use, with a resultant possible change in the intestinal flora. On the other hand the bacterial flora are also capable of synthesizing certain members of the B complex and also vitamin K, possibly in amounts enough to meet requirements for some time.[4]

2. In the field of diseases affecting absorption the *dysenteries* must receive first mention, and often produce marked vitamin deficiencies com-

plicating the original disease. Pernicious vomiting might also be included here as interfering with absorption.

3. Chronic hepatic and cholecystic disease will interfere with the absorption of the fat soluble vitamins, including A, D, E, K and T. In many cases it is wise to give bile salts along with therapy of such fat soluble vitamins.

4. Wasting diseases, including various forms of intestinal obstruction, may produce vitamin deficiencies.

5. Mechanical obstruction to absorption may be the explanation of the action of mineral oil in decreasing absorption of carotene or provitamin A. I should mention that a quite substantial amount of mineral oil—at least 2 ounces —must be present at one time to exert any appreciable effect. The danger is therefore not as great as might be thought.

BLOOD LEVELS—EXCESSIVE DEMANDS

After absorption comes the establishment of various blood levels and tissue stores. Very low blood levels of vitamins may be entirely compatible with current good health, but still classify as a potential deficiency. However, some conditions are definitely met better with high blood levels, and these conditions may be physiological, such as pregnancy, or pathological. Such high blood levels and tissue stores may require the use of vitamin concentrates. Severe physical stress or strain may precipitate a vitamin deficiency. (1) Pregnancy has already been mentioned. (2) The fact that deficiencies often appear postoperatively emphasizes the need for using vitamins preoperatively to overcome this potential deficiency. The course of operative recovery may be greatly influenced as for example in the proved value of ascorbic acid in wound healing. (3) Antibody formation may benefit from blood levels that are higher than average. A generous intake of ascorbic acid has been especially recommended to assist antibody formation, as well as members of the B complex.

4. Hyperpyrexia, from whatever cause, raises the need for vitamins, especially water-soluble vitamins. This is presumably associated with the general increase in metabolism.

5. The physiological action of a vitamin may be interfered with by certain drugs, and this needs to be combated by blood levels that are higher than average. For instance, the sulfonamide drugs interfere with the formation of white cells occasionally, even producing a fatal agranulocytosis. There is some clinical evidence that this effect of sulfa drugs may be combated by one or more vitamins. Ascorbic acid, pyridoxine and folic acid have each been assigned this rôle by different investigators, showing that our knowledge is not enough to be sure. The obstruction of vitamin supplies in tissues may be quite local in nature. For example, high blood levels of nicotinic acid or niacin have been found of value in terminal heart failure. This observation is explained by supposing that the damaged heart produces substances preventing the cells from using niacin. It may be recalled that the heart stimulant coramine has a chemical structure consisting of nicotinic acid with an attached diethylamine group. Other examples of local needs being met by higher-than-average blood levels include the reversible destruction of vitamin A compounds in the retina of the eye, by means of light. A destruction of riboflavin in the cornea by light has been associated with glare and snow blindness, but this is not supported by all the evidence.

6. High blood levels of vitamins are not always desirable because there is some evidence that in certain cases they result in toxic manifestations. Furthermore, some cancer cells are retarded in development by producing vitamin deficiencies.[5] Therefore, we cannot assume that more is always better in the physiological economy of the body.

EXCRETION OR STORAGE

The ultimate fate of a vitamin varies. Fat soluble vitamins like A are usually stored in the liver. Water soluble vitamins seem to have kidney thresholds, although we know very little about the governing mechanisms. Under certain conditions these normal end results of assimilation are changed. In chronic hepatic disease carotene and vitamin A may be stored in abnormal places, including the skin. Under some drug therapies the rate of excretion seems to increase. For example salicylate therapy of rheumatic fever and arthritis may cause increased excretion of thiamine, ascorbic acid and even vitamin K. The use of vitamin concentrates during salicylate treatment might therefore be proper, though the case is not established.

CONCLUSION

In all cases vitamin concentrates are used properly only as a supplement to efforts at establishing sound dietary habits and the intake

of a varied diet of natural foods. There are many abuses, and really very few indications for the use of vitamins. These uses may be grouped under four headings according to the normal processes of assimilation:

1. *Low intake* of food vitamins due to poverty, fads, ignorance, lack of interest, psychopathia, old age, and the use of special diets such as for infants, and treatment of ulcers, etc.

2. *Absorption* may be affected by intestinal bacteria, dysentery, emesis, cholecystic disease, and mechanical obstruction.

3. *Blood levels and tissue stores* may advantageously be maintained at high levels with vitamin concentrates for antibody formation, and under stresses like pregnancy, operations, hyperpyrexia, and the interfering action of certain drugs including sulfonamides.

4. The storage or excretion of vitamins may be interfered with, as in the excess excretion said to be caused by salicylates.

REFERENCES

1. RUFFIN, J. M.: The use and abuse of vitamins in the treatment of mild or early deficiency states, *Nutrition Reviews*, 2: 353, 1944.
2. PETT, L. B.: Malnutrition in Canada, *Canad. M. A. J.*, 50: 1, 1944.
3. RANTA, L. E.: The value of vitamin concentrates, *Canad. Nurse*, 40: 759, 1944.
4. Synthesis of vitamins in the digestive tract, *Nutrition Reviews*, 1: 220, 1943.
5. Vitamins and the growth of tumours, *Nutrition Reviews*, 1: 361, 1943.

RÉSUMÉ

L'emploi des vitamines est devenu une habitude et une mode. En réalité, les vitamines supplémentaires du commerce ne sont pas souvent nécessaires. On doit les employer uniquement lorsque les 4 groupes de circonstances suivantes l'exigent: (1), lorsque l'alimentation est insuffisante: par pauvreté, par ignorance, par caprice, par manque d'intérêt, par une psychopathie, par l'âge avancé et par l'emploi de régimes spéciaux tels que ceux du nourrisson ou de l'ulcère de l'estomac; (2), lorsque l'absorption intestinale est empêchée ou retardée par des facteurs infectieux ou mécaniques; (3), lorsqu'il y a intérêt à maintenir à un niveau élevé la formule sanguine et les réserves tissulaires, comme par exemple, dans la grossesse, avant et après les opérations, dans l'hyperthermie et lorsque l'on emploie certains médicaments, notamment les sulfamidés; (4), lorsque l'excrétion est accélérée, comme c'est le cas au cours des cures par les salicylates. JEAN SAUCIER

I believe it is paramount that we doctors remain detached from political colour. For the doctor there can be no "left" or "right". For him there is only expert knowledge, a rooted adherence to truth, horse-sense, and a humanist outlook, which, after all, means nothing more nor less than a love for his fellows and a passion to help them, body and soul.—Lord Horder, *Brit. M. J.*, 1: 358, 1945.

SOME PROBLEMS OF NEO-NATAL LIFE*

By S. G. Ross, M.D.

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MY remarks today will be based on observation over a period of years of new-born infants in the clinic of the Royal Victoria Maternity Hospital in Montreal. A study of mortality rates in this institution during the past 40 years is of interest. During the first 20 years of the period there was a gradual reduction in neo-natal mortality, whereas in the past 20 years the mortality rate has remained almost stationary at about 4%. Does this represent the irreducible minimum, or does it represent a problem which is partially capable of solution?

In a recent year in the Maternity Hospital there were 94 infant deaths; of these, 47, or 50%, were premature infants, which immediately raises the problem of prematurity. Of the 94 infants, 51 were born dead and 11 were still-born.

Some of the causes of neo-natal mortality are unavoidable, *e.g.*, congenital malformations, although even here the nutrition of the mother may play a part. A consideration of the other causes leads to the realization that prematurity, with all that it implies, is our most important problem. Intracranial hæmorrhage and cerebral anoxia also require careful consideration, and in recent years there has been a renewed interest in the subjects of hæmolytic anæmia of the new-born and hæmorrhagic disease of the new-born. I propose, therefore, to discuss briefly the above-mentioned conditions.

PREMATURITY

Let us first consider prematurity. In a review of the causation of prematurity over a period of years it came as a surprise to find that a history of maternal toxæmia could be obtained in 48% of all premature births. This obscure condition, which may be in part due to the nutritional state of the mother, is obviously the main factor in prematurity. The obstetricians realize that this is their problem; not only do they require to consider the safety of the mother, but, in addition, they frequently have to balance the risk to the infant of early termination of pregnancy against the chance

*Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Pædiatrics, Toronto, Ontario, May 25, 1944.

of increased toxicity in the larger infant if the pregnancy is prolonged.

It is well recognized that the premature infant born of a toxic mother has a poor survival rate. In the group of 47 premature infants who died a history of toxæmia in the mother was present in 23, and of these 16 were born dead or still-born.

The high incidence of intracranial hæmorrhage in the premature infant is well recognized. The structural weakness in the supporting membranes of the brain and the blood vessels themselves are the primary condition for this accident. We now recognize in addition that the premature infant has a delay in blood coagulation which favours the prolongation of bleeding from the torn blood vessel. This is the result of the relatively low concentration of prothrombin in their blood, which others and ourselves have demonstrated. The causation of this is probably due to diminished liver function of which there are other evidences in the premature. It is therefore good practice in all prematures to administer vitamin K intramuscularly at birth in an attempt to control intracranial hæmorrhage if present.

The premature infant is particularly subject to icterus neonatorum. While this frequently gives rise to no symptoms we find that, where marked, it produces lethargy and feeding difficulties. In such cases we supplement the fluid intake by giving one or more hypodermic injections daily of glucose saline solution and attempt to increase the fluid intake by glucose solution between feedings. Gavage feedings are used when required.

The problem of feeding the premature is always with us. Our practice is to begin feeding all premature infants under four pounds in weight with breast milk which is obtained from the mother by pumping, or from the breast milk dairy. However, some infants do not gain satisfactorily on breast milk. This is frequently due to a deficiency of protein in which the premature's requirements are high. In such cases we supplement breast milk by the addition of calcium caseinate, using 1 tablespoon to 4 or 6 ounces of breast milk. When the infant's digestion is well established and it has reached a satisfactory weight the infant is placed on a moderately low fat diet, with somewhat increased carbohydrates. Our standard feeding at present is a 2% evaporated milk. The results of this type of feeding are satisfactory.

In a few cases where satisfactory progress is not obtained we have found that the use of blood plasma given subcutaneously has been of value. This is rapidly absorbed and supplies protein to the infant. The amounts given vary from 40 to 80 c.c. repeated at suitable intervals.

INTRACRANIAL HÆMORRHAGE

I wish to discuss shortly only one group of such cases, namely, the subdural hæmatomas. Through the combined efforts of the pædiatrician and the neurologist we are becoming more aware of this condition. It frequently occurs in association with subarachnoid bleeding. Not infrequently, after the signs and symptoms of subarachnoid bleeding disappear, this condition persists or develops. Its etiology is based on the fact that a subdural effusion of blood, unlike a subarachnoid effusion, is poorly absorbed and may increase. The fluid is bloody, tends to remain liquid and at times becomes enclosed by a thick membrane. Later the blood cells may disappear leaving a xanthochromic or clear fluid with a high protein content. This condition may show immediate symptoms or may remain "silent" for days, weeks or even months. It should be suspected in any new-born infant usually with a history of birth injuries or hard labour—although this is frequently absent—who shows signs of increased intracranial pressure with a bulging fontanelle, vomiting, increasing size of head, in whom the lumbar puncture does not show blood, although the spinal fluid may be xanthochromic. There are frequently signs of cerebral irritation, focal or general, in the form of convulsions, localized spasticity or paralyses. General symptoms, such as difficulty in feeding, irritability and unexplained bouts of fever, are frequently present even in the absence of the above-mentioned signs. In such cases the diagnosis depends upon the clinical acumen of the observer. The diagnosis may be established with the aid of the neurologist by lumbar puncture, subdural puncture and encephalogram. Early recognition and subsequent suitable treatment by the neurosurgeon is important if one is to obtain favourable end results.

Cerebral anoxia is another condition which I shall mention only in passing. Of the numerous causes leading to this dangerous condition, I

should like to stress the growing realization of the risks of indiscriminate prepartum anæsthesia and analgesia on the infants. The safety of the child must not be forgotten in the effort to provide an entirely painless labour for the mother. Obstetricians are well aware of this problem as a result of our increased knowledge of this subject.

HÆMOLYTIC ANÆMIA OF THE NEW-BORN

This condition which is commonly although less accurately spoken of as erythroblastosis of the new born, was formerly included in the general title icterus gravis. My concept of these cases of severe jaundice in the new-born is the following; in a small group severe and persistent jaundice appears where no excessive hæmolysis has taken place. There is no resultant anæmia; no gross obstruction of the bile ducts is present. It occurs more frequently in premature infants. The constitutional symptoms are not severe, although for a time the infants may take food poorly, show some lassitude and fail to gain. This appears to be an exaggerated form of icterus neonatorum, probably resulting from a delayed development of liver function. By far the larger and more important group clinically are the infants who show a severe hæmolytic anæmia which is present at birth or develops shortly after. It is associated with severe jaundice and constitutional symptoms. Food is taken poorly, there is a tendency to œdema, hæmorrhage and sudden death. The blood contains large numbers of immature red and white cells. The cause of death is often obscure—hæmorrhage, cardiac failure or liver damage may all play a part.

This is the group which, in a very large percentage of cases, is associated with the combination of an Rh positive father, an Rh negative mother and an Rh positive child. The phenomenon is apparently due to the immunization of the mother with the Rh agglutinogen and subsequent passage of Rh agglutinins into the fetal circulation. These cause hæmolysis of the infant's blood.

Several features of this condition have come to my attention which deserve comment. In the first place, importance of early diagnosis. An infant who is jaundiced at birth or who develops *early severe* jaundice should be treated as an emergency. A hæmoglobin and red count should be made, as the anæmia is often masked by the jaundice. Of less importance, but advisable, a differential count, a bilirubin and a prothrombin estimation of the blood. The van den Bergh test shows a hæmolytic type of reaction. The hæmoglobin should be followed daily, as it gives the indication for the number of blood transfusions required.

Secondly, the incidence of hæmorrhage. The commoner type occurs early and may be severe, even fatal. The cause for this may be liver damage. In favour of this assumption we have the pathological findings of liver cell damage in these cases. Also, these patients show frequently a marked reduction in the prothrombin content of the blood. This may also be evidence of disturbed liver function and is the most satisfactory explanation of the spontaneous bleeding. It is a good rule therefore to give all these patients adequate vitamin K intramuscularly and where possible to follow the prothrombin time in the blood. If bleeding does not stop with this our only recourse is to give blood transfusions.

Less commonly one sees hæmorrhage later in the disease, usually in the second week of life. In one such case an infant with a severe type of hæmolytic anæmia survived the first ten days of life with the aid of transfusions, only to succumb on the twelfth day with severe hæmorrhage. Blood studies throughout this period showed that the jaundice had increased steadily. During this period the ratio of the direct reacting pigment to the total increased steadily, indicating a transition from a hæmolytic type of jaundice to an obstructive type. Post-mortem findings revealed a complete blocking of the bile canaliculi in the liver by bile thrombi. The bile ducts had evidently been unable to carry off the excess of bile pigment passing through the liver cells, with the result that an obstructive jaundice developed. At this time the relationship of prothrombin deficiency to lack of vitamin K absorption was not understood. Several cases similar to this developed subsequently which showed prothrombin deficiency in the blood. These responded satisfactorily to vitamin K administered intramuscularly.

Thirdly, a certain percentage of these cases show a comparatively gradual onset. We have seen infants in which there is a gradually developing anæmia often progressing to the second or third week of life and associated with jaundice and a bilirubin reaction which suggests

hæmolysis. This type requires an explanation; it occurs at a time at which one would expect the hæmolytic phenomenon to be disappearing.

Fourthly, in some cases we find Rh positive infants who have an Rh positive father, and Rh negative mother, in whom no evidence of hæmolysis, such as anæmia and jaundice, develops. There must be therefore other factors required to induce this condition. While, theoretically, Rh negative blood should be used in transfusing these cases, we have not had sufficient experience to evaluate the advantages of this procedure. We can, however, state that no transfusion reactions have been observed when using Rh negative blood for transfusions. On two former occasions we observed severe transfusion reactions with hæmoglobinuria; these may have been the result of transfusing an Rh positive infant with Rh positive blood.

Hæmorrhagic Disease of the New-born

This condition, which is associated with a diminished coagulation of the blood in the new-born period, is now known to be dependent on the prothrombin factor in the coagulating mechanism. It is of interest to consider some of the conditions which may give rise to an abnormally reduced prothrombin in the first few days of life. It is known that prothrombin formation takes place in the liver and is dependent upon an adequate supply of vitamin K and an undamaged liver.

We should consider what factors in the new-born might cause disturbed liver function or interfere with the absorption of vitamin K from the intestine. In a study of the prothrombin content of the blood during the first week of life we found several conditions which seemed to reduce the prothrombin. Asphyxia of the new-born apparently is a definite factor. This is in accord with our impression that asphyxiated infants are more prone to hæmorrhage than normal infants. A possible explanation is that experimentally anoxæmia may cause liver damage. This might result in diminished prothrombin formation. Secondly, prematurity. The premature infant is prone to hæmorrhage and our studies revealed that the prothrombin content of the blood in prematures tends to be low. Thirdly, it is recognized that in hæmolytic anæmia of the new-born with jaundice, hæmorrhage is not uncommon. Several factors may be at work here—namely, liver damage which is sometimes present. This could interfere with prothrombin formation. There is also a late type of bleeding which as mentioned before is due to an obstructive jaundice developing as a sequel to the hæmolytic jaundice, thus interfering with the normal absorption of vitamin K.

It is not suggested, however, that the above-mentioned factors are the ones responsible for the majority of cases. The fact that the administration of vitamin K to the mother before, or during, labour can prevent the development of abnormal hypoprothrombin-anæmia in the infant may indicate that, in many cases, dietary deficiencies in the mother are a factor in the production of the condition. The main factor may be a lag in the formation of vitamin K in the intestine of the new-born infant, which is dependent upon the intestinal microorganisms in the bowel. It is our practice to administer vitamin K intramuscularly in doses of 5 mgm. to all prematures, asphyxiated babies, babies who have had a hard labour and babies with hæmolytic anæmia, as well as to all infants showing spontaneous bleeding or signs of intracranial damage. By such methods we feel that the dangers of spontaneous hæmorrhage and, to a certain extent, intracranial hæmorrhage may be averted.

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PRACTICAL METHODS OF SUPPLYING THE ESSENTIAL VITAMINS OF CHILDHOOD*

By Elizabeth Chant Robertson, M.D.

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EVEN in the prenatal period the vitamin needs of the developing child should be provided. The recent work of Ebbs[1] and his associates demonstrated very clearly how the baby is benefited when the mother eats an excellent diet during the latter half of pregnancy.

Part of this investigation was as follows: a series of women attending the obstetrical outpatient department of the Toronto General Hospital were interviewed some 3 to 4 months

* Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Pædiatrics, Toronto, Ont., May 25, 1944.

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before term. They were asked to record as accurately as possible all the food they ate in the next week. A dietitian checked this over with the mother to make sure that it was reasonably accurate. About 200 of these women were found to be eating very poor diets. They were therefore divided into two closely similar groups. One group was then provided with extra food at no expense to themselves. The extra food provided amounted each day to the following: one orange, 4½ ounces of factory tinned tomatoes, 30 ounces of milk, 1 ounce of cheese, an egg, two tablespoons of wheat germ containing added iron, and a capsule containing 2,000 international units of vitamin D. The 90 women receiving the supplementary food will for convenience sake be called the supplemented diet mothers; the 120 control mothers who received only a placebo containing corn oil, the poor diet mothers. The supplemented diet mothers developed far fewer complications during pregnancy, labour and post partum than the poor diet group. But what is of more concern to us at the present moment is that 50% more of their infants were in good condition during their first two weeks of life.

In the first 6 months of their lives, 5.5% of the babies of the poor diet group developed clinical rickets, whereas none of the babies of the supplemented diet group showed evidences of this disease. Tetany of the newborn occurred in 4.2% of the babies in the poor diet group, but not one child in the supplemented diet group developed this condition. One would conclude therefore that the generous amounts of calcium that the mother received in the daily pint and a half of milk and ounce of cheese, and the provision of liberal quantities of vitamin D was of definite value to the child. One would also infer that their deciduous teeth and their six-year molars which are partially formed before birth would likely have benefited too. Ebbs[1a] and his associates reported that the maternal blood phosphatase was somewhat lower in the supplemented diet group. A rise in the blood phosphatase indicates some abnormality in bone formation, therefore the lower phosphatase in these supplemented diet mothers suggests that their calcium metabolism was functioning more normally. The ascorbic acid or vitamin C level in the maternal blood at term was 50% higher in the mothers that received the food supplements.

The infants of the mothers eating the poor diets had about three times as many respiratory infections during the first six months of their lives as the infants whose mothers received the supplementary food. The records for miscarriages and infant deaths in the two groups were as follows. Of the 120 mothers on the poor diet, 7 lost their babies by miscarriage, 4 gave birth to dead babies and 4 infants died during the first six months of life (two from pneumonia, one from prematurity, and one as the result of a congenital malformation). Fifteen babies in all were lost by this group of mothers. In contrast to this, only two of the babies in the supplemented diet group died, both from congenital malformations. Congenital malformations are believed to have their origin early in pregnancy and one would not expect them to be prevented by improving the diet in the last 3 or 4 months.

The recently reported findings of Burke, Stuart and their collaborators[2] are similar. They found that the infants of mothers who had eaten poor or very poor diets during their pregnancy were usually in poor condition at birth and in the first two weeks of life. On the other hand, the mothers who had a good or excellent diet during pregnancy generally gave birth to infants that were in good or excellent condition. The progress of the infants beyond the age of two weeks was not discussed in this report.

The Importance of Maternal Diet During Lactation

Ebbs[3] found that 39% of the supplemented diet mothers nursed their infants for 6 months, although the supplements were stopped a month and a half after delivery. A considerably smaller percentage (24%) of the poor diet mothers fed their infants at the breast for 6 months.

Several investigators[4] have shown that the vitamin C level in breast milk is higher when the mother eats good quantities of vitamin C than when she eats little of it. The same apparently holds true for vitamin B_1.[5] The breast milk of mothers who are eating diets rich in vitamins is therefore much superior to that of mothers on poor diets. In fact the Committee on Foods and Nutrition[6] of the National Research Council of the United States, which is made up of many of the leading nutritionists on this continent, recommends that lactating

mothers should eat more of two of the vitamins (A and C) than any other class in the population. As far as the B vitamins and vitamin D are concerned, their requirements for these are high also. During lactation a woman's needs for the vitamins are higher than at any other period in her life and it is generally conceded that the breast milk of a healthy, well-fed woman is definitely the best food for the infant.

VITAMIN K

Numerous investigators have shown that vitamin K is necessary for the formation of prothrombin. Lack of prothrombin in the circulating blood increases the likelihood of hæmorrhages. Our sources of vitamin K are two in number. Firstly it is present in many of our foods, especially in green vegetables, such as spinach and cabbage. Secondly, it is apparently synthesized for us by the intestinal bacteria. Except in the newborn period, it is not necessary to consider vitamin K in planning the diets of normal individuals.

In the newborn period—partly because of the fact that the intestinal tract is sterile at birth—the prothrombin time is frequently prolonged. Snelling[7] recently determined the prothrombin time in the cord blood of a large series of newborn infants. In 14% of them the prothrombin times were as long as those found in hæmorrhagic disease of the newborn. Apparently some other factor, possibly blood vessel trauma, is necessary before hæmorrhagic disease appears, but this hæmorrhagic tendency is a potential danger: 5% more of these infants showed moderately prolonged prothrombin times.

In another series of infants, the mothers were given 5 mgm. of vitamin K (2 methyl, 1-4 naphthoquinone) in oil in capsule form by mouth after the onset of labour, but at least 4 hours before delivery. None of their infants showed either markedly or even moderately prolonged prothrombin times in the cord blood. In addition Snelling determined the prothrombin times of these infants daily up to the 10th day of life and only 2% of them showed at any time a reading that was above the normal. In contrast to this, 56.5% of the control series (whose mothers had not received the dose of vitamin K) showed prothrombin times that were longer than normal.

Therefore it is safest to give 5 mgm. or thereabouts of vitamin K by mouth to all mothers at least 4 hours before delivery. If delivery does not occur within 40 hours after the vitamin K was given, it should be repeated. If the mother vomits it, more should be administered, either by mouth or intramuscularly. These procedures will prevent hæmorrhagic disease of the newborn infant. If the mother has not been given vitamin K between 4 and 40 hours before delivery, it is advisable to give the baby approximately 2 to 5 mgm. of vitamin K intramuscularly as soon after birth as possible.

VITAMIN C

At what age should the administration of vitamin C be started? In order to find an answer to this question Snelling[8] determined the amount of vitamin C in the blood of a series of artificially fed infants under three months of age. He found the average plasma reading to be 0.19 mgm. %. Ingalls[9] states that 0.7 mgm. % is the lower limit of normal for the plasma ascorbic acid. This figure is approximately four times as high as the average in Snelling's series. The level of vitamin C in the cord bloods of the infants of the poor diet mothers[1] averaged 1.0 mgm. %. This would suggest that the post-natal level should be much higher than 0.19 mgm. %. Therefore, it is recommended that artificially fed babies should receive vitamin C from the age of 2 weeks to 1 month on, even though frank scurvy is not seen before the age of about six months. Scurvy develops slowly. Boiled pasteurized milk contains practically no vitamin C and sugars or flours of course are entirely devoid of it. There is good evidence[10] that latent scurvy is associated with a markedly increased incidence of infections of the respiratory tract, of tuberculosis and of pyelitis in infants, which is another argument in favour of the early administration of vitamin C.

Babies that are totally breast fed and whose mothers are eating generous amounts of vitamin C will probably obtain enough of this vitamin, but if the lactating mother has not enough vitamin C in her diet, her infant will not receive as much of this vitamin as is desirable. Therefore it is safer to treat breast fed infants in the same way as bottle fed babies—that is, to begin orange juice at 2 to 4 weeks of age. This procedure does no harm and makes the infant's supply sure. The Committee on Foods and Nutrition[6] of the National Research Council recommends that nursing mothers take 150 mgm. of vitamin C daily. A drinking glass (8 ounces)

of orange juice plus a similar glass of tomato juice would provide that much—but you will note that this is a very large amount.

The mother should be instructed to strain the infant's orange juice. When it is first begun, at 2 to 4 weeks of age, it is best to give only 1 teaspoonful diluted with an equal amount of cooled boiled water. The amount should be increased gradually so that by 3 months of age the infant is receiving 2 ounces of orange juice daily. One ounce of boiled water is sufficient to dilute this. It is best to give half the juice about 9 a.m. and half about 4 p.m. as less is excreted if it is given in divided doses. After about 10 months of age 3 to 4 ounces of orange juice per day is the recommended amount and the diluting water may be omitted. After the age of two years the orange juice may be taken with one of the meals and can be partially replaced on some days by a sliced orange for dessert.

Strained factory canned tomatoes or tomato juice can be substituted for orange juice but in that case the dose should be three times as large. In other words, at 2 to 4 weeks the child would receive 3 teaspoonfuls of tomato juice; at 3 months about 6 ounces and at 10 months, 9 to 12 ounces. Water need not be used to dilute the tomato juice. Because of the very large amounts needed to meet the accepted requirements, tomato juice is not a suitable substitute for orange juice in infancy.

VITAMIN D

Rickets takes some months to develop. Therefore it is advisable to start the infant on a reliable source of vitamin D at the age of two to four weeks. The fish liver oils are better than viosterol and similar preparations because they supply the daily requirements of vitamin A in addition to vitamin D. The more potent percomorph fish liver oils are preferable to the weaker cod liver oils because it is easier to administer the smaller dose of the former.[11] If cod liver oil is used, the mother should be instructed to buy one of the several well known excellent brands, as they contain two or three times as much vitamin D as the minimum United States Pharmacopœia requirements call for. She can also be assured that the high potency fish liver oils are just as cheap as the good brands of cod liver oil.

At two to four weeks of age therefore the infant should be given 5 drops of percomorph liver oil, or if you prefer, half a teaspoon of cod liver oil. Two weeks later or thereabouts the dose of cod liver oil should be increased to one teaspoonful. The high potency fish liver oils are best administered by giving them drop by drop directly into the side of the infant's mouth. If preferred, they can be dropped into a spoonful of orange juice. They should never be placed in a dry spoon, as too much of the oil sticks to the spoon. For the same reason, the oil should not be added to the feeding, as it adheres to the bottle and the infant does not obtain the full dose. The amount can be increased to 10 drops of percomorph liver oil or 2 divided doses, each of one teaspoonful, of cod liver oil soon after this time. On account of the difficulty in restarting cod liver oil after its administration has been interrupted, it is preferable to give it continuously both summer and winter until the end of the second winter. If a high potency fish liver oil is used, it may be discontinued from the middle of June to the middle of September provided the child is given sunbaths, as there is no difficulty in recommencing it. There is good evidence[12] that the daily administration of 5 drops of potent fish liver oil or 1 teaspoonful of cod liver oil during the 7 colder months of the year throughout the whole of childhood will reduce the incidence of dental caries. The practice should therefore be carried out regularly during the growing period.

THE B VITAMINS

Milk contains fair amounts of thiamin and large amounts of riboflavin. Provided the infant receives cereals, preferably pablum, at about 3 to 5 months of age, egg yolk at about 6 months, vegetables at about the 8th month, and suitable meat and fruit at about the 10th month, there seems to be no advantage in providing more of the B vitamins. In adding these foods to the diet it should be remembered that the infant can be trained to take them more readily if they are introduced in small quantities and one at a time.[13]

SUMMARY

The use of prenatal diets containing sufficient of foods rich in vitamins and minerals reduces the incidence of miscarriages and stillbirths, and lowers morbidity and mortality during the first six months of life. It is recommended that the lactating mother receive even more of several of the essential food factors. In order to prevent

hæmorrhagic disease of the newborn it is advisable to give 5 mgm. of vitamin K (2 methyl 1-4 naphthoquinone) in oil by mouth to all mothers 4 to 40 hours before delivery.

It is recommended that vitamin C (best given as orange juice) and vitamin D (preferably as high potency fish liver oil) be started at 2 to 4 weeks of age. During the first year the amount of orange juice should be increased until at 10 months of age the child is receiving 3 to 4 ounces.

REFERENCES

1a. EBBS, J. H., TISDALL, F. F. AND SCOTT, W. A.: *J. Nutr.*, 22: 515, 1941.

b. EBBS, J. H., TISDALL, F. F., SCOTT, W. A., MOYLE, W. J. AND BELL, M.: *Canad. M. A. J.*, 46: 1, 1942.

c. EBBS, J. H., BROWN, A., TISDALL, F. F., MOYLE, W. J. AND BELL, M.: *Canad. M. A. J.*, 46: 6, 1942.

2. BURKE, B. S., BEAL, V. A., KIRKWOOD, S. B. AND STUART, H. C.: *J. Nutr.*, 26: 569, 1943.

3. EBBS, J. H. AND KELLY, H.: *Arch. Dis. Child.*, 17: 212, 1942.

4. INGALLS, T. H., DRAPER, R. AND TEEL, H. M.: *Am. J. Dis. Child.*, 56: 1011, 1938.
GEDDA, E. AND KJELLBERG, K.: *Act. pæd.*, 26: 177, 1939.

5. KNOTT, E. M., KLEIGER, S. C. AND SCHLUTZ, F. W.: *J. Pæd.*, 22: 43, 1943.

KNOTT, E. M., KLEIGER, S. C. AND TORRES-BRACAMONTE, F.: *J. Nutr.*, 25: 49, 1943.

MORGAN, A. F. AND HAYNES, E. G.: *J. Nutr.*, 18: 105, 1939.

SLATER, E. C. AND RIAL, E. J.: *Med. J. Austr.*, 1: 3, 1942.

6. Recommended daily allowances for specific nutrients, Committee on Foods and Nutrition, National Research Council, *J. Am. M. Ass.*, 116: 2601, 1941.

7. SNELLING, C. E.: *J. Pæd.*, 17: 615, 1940; *ibid.*: 22: 77, 1943.

8. SNELLING, C. E. AND JACKSON, S. H.: *J. Pæd.*, 14: 447, 1939.

9. INGALLS, T. H.: *J. Pæd.*, 10: 577, 1937.

10. PERLA, D. AND MARMORSTON, J.: *Arch. Path.*, 23: 543 and 683, 1937.

11. DRAKE, T. G. H., TISDALL, F. F. AND BROWN, A.: *Canad. M. A. J.*, 31: 368, 1934.

12. ANDERSON, P. G., WILLIAMS, C. H. M., HALDERSON, H., SUMMERFELDT, C. AND AGNEW, R. G.: *J. Am. Dent. Ass.*, 21: 1349, 1934.

13. DRAKE, T. G. H.: *Canad.* M. A. J., 39: 578, 1938.

RÉSUMÉ

On peut administrer de différentes façons les vitamines essentielles à l'enfance. Le femme enceinte pourra tout d'abord utiliser un régime riche en vitamines et en sels minéraux; elle évitera ainsi les fausses couches et la morti-natalité en même temps qu'elle augmentera la vigueur de son enfant au cours des premiers six mois. Plus tard, lorsqu'elle allaitera, elle prendra en surabondance les aliments hautement vitaminés. Elle préviendra les maladies hémorrhagipares du nouveau-né en prenant de la vitamine K durant les deux jours qui précèdent l'accouchement. La vitamine C (jus d'oranges) et la vitamine D (huile de foie de poisson) seront données dès l'âge de 2 à 4 semaines. Enfin, le jus d'oranges sera augmenté de telle façon qu'à 10 mois l'enfant en prenne 3 à 4 onces par jour. Les vitamines du groupe B seront prises dans l'alimentation quotidienne sous forme de lait, de céréales, de jaune d'œuf, de légumes et de fruits. JEAN SAUCIER

VALUE OF ORTHOPTICS IN TREATMENT OF STRABISMUS*

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ORTHOPTIC training is a problem which is becoming more prominent in the science of ophthalmology. In the last 10 years much progress has been made toward putting orthoptics on a firm basis. Clinics have been established in various cities in England and the United States where the subject has been studied carefully. Some reports of the work have been definitely over-enthusiastic while others have more or less condemned orthoptics.

Orthoptic training has a definite place in the treatment of strabismus but not the place that a great many people think it has. Unfortunately, "muscle training" has been widely practiced by non-medical groups and used as a means of extracting large sums of money from the public. The same instruments are used as in orthoptic training. Many cases have come to the Hospital for Sick Children's clinic with the history of having had a series of muscle training exercises and have been relieved of two or three hundred dollars but not of the strabismus. As a result, orthoptics has fallen into disrepute.

Attempts have been made to straighten cross-eyes by non-surgical means for many years and the public is always willing to take exercises rather than undergo surgical procedure. We have all seen the failures in so-called muscle training and many of us were very sceptical about the value of orthoptics.

Very few oculists have the time and patience necessary to do the mechanical part of orthoptic training. This should be done by an orthoptic technician. The American Orthoptic Council has made great strides forward in establishing a standard for orthoptic technicians and requiring certain qualifications before they are allowed to practice orthoptics. All women are not suitable for this type of work. The training itself requires a good knowledge of physics and optics. The ability to handle children and make them do what is wanted is important.

*Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Ophthalmology, Toronto, Ont., May 25, 1944.

A great many people believe that orthoptic training consists of sitting a patient in front of a few machines. This is far from true. Before one can do good work in strabismus he must thoroughly understand the diagnosis of the muscle anomalies. It is very important that an accurate diagnosis of the muscle balance be made before orthoptic training is started.

The use of instruments such as the synoptophore, stereo orthopter, amblyoscope, etc., will not cure strabismus. In fact, the indiscriminate use of these makes the condition very much worse. It has been the custom for many oculists to turn over cases of strabismus to an orthoptic department without making any attempt to diagnose or outline the type of treatment necessary. Some expect the orthoptic training will correct a poor operative result. This is expecting too much.

What cases are suitable for orthoptic training? That would be easier to answer by stating what cases are *not* suitable. They are: (1) vertical deviations; (2) congenital amblyopia; (3) paralysis; (4) patients who do not show sufficient co-operation, particularly those of a nervous temperament; (5) those where a muscle anomaly is secondary to some central nervous lesion. All other cases of strabismus such as accommodative, convergence excess, divergence weakness, divergence excess and convergence weakness are suitable for orthoptic training.

One should have a definite routine to follow in the diagnosis and it should cover the following tests: history, vision, corneal reflex test, screen and parallax, excursion test, convergence near point, prisms convergence and divergence, diplopia plotting, maddox rod, refraction under cycloplegic.

It is not usually possible to do all these tests in children but enough can be done to determine if the condition is a paralysis, convergence excess, divergence weakness or vertical imbalance. The presence of amblyopia or false retinal correspondence should be determined. These tests are all based on Duane's work and were described in this *Journal* in 1941.[1]

The routine at the Hospital for Sick Children is as follows.

All cases of strabismus are seen by the resident, who takes the history and determines the type of strabismus and if amblyopia is present. They are then referred to the orthoptic department and again measured by the orthoptic technician, particularly to determine if there is false projection. It can be found by the synoptophore. If vision is defective in one eye, the good eye is covered until central fixation is obtained. This may take from one to several months and is the part most trying to the parents.

The instillation of atropine in the good eye, or partial occlusion at home, has not been found to be of any advantage. The dressing should be put on the good eye by the technician and the parents carefully instructed in the importance of keeping the eye covered. Frequency of visits varies with different cases. Some clinics go as far as having the child admitted to the hospital where daily treatment can be given. That is not possible here and usually the best that can be accomplished is treatment once or twice a week.

At regular intervals of a week or so the vision is checked and an attempt is made to develop fixation and fusion by the use of the synoptophore. When the orthoptic technician feels that the vision and fusion have improved as much as possible then surgery is done. Fusion training is continued after operation until binocular fixation is obtained. This whole course of treatment may take several months and one should be in no hurry.

If the child is of school age co-operation of the teachers must be sought if vision is much below normal in the bad eye. Some teachers have been known to rip the pad off the good eye, telling the parents that school was more important than treating the crossed-eyes. However, this does not occur very often. The child may not see well enough to get around and the parents must be warned of this.

The ideal time for treatment is before the child goes to school and in the Toronto area this ideal is being accomplished through the co-operation of the pædiatricians and family doctors.

If the vision does not improve in a few weeks there is usually no use in continuing occlusion, as the amblyopia is likely congenital or there is a defect in the macular area. The only cases where strabismus is improved by exercises alone are those due to convergence weakness. Cases of convergence excess are usually due to hyperopia and of course glasses will straighten a great number of them.

All eye surgeons have had the experience of doing what was considered an excellent operation for strabismus, with a good result for a few months. Then the eye would gradually go back to its original position. Some of these cases have been checked at the Hospital for Sick Children. It was found that many of them had false projection and the desire to fuse the true and false macula was too great, so the eye turned in again. Some of these cases have been treated by breaking down false projection by occlusion and stimulating the desire to fuse by orthoptic training. A few have straightened with nothing more being done while others required another operation.

Success in the treatment of strabismus depends on two things: first, the correct diagnosis of the underlying condition, and second, proper treatment and performance of an operation, if it is necessary.

There are many ways to shorten or lengthen a muscle. The important thing is to learn to do one type of operation well, whether it be a recession, resection or advancement. Tenotomies are too uncertain and are not done at the Hospital for Sick Children. To lengthen a muscle, a recession is done, but unlike the Jameson recession the stitch is brought up to the muscle stump then through the layers of conjunctiva. To shorten a muscle, a resection which has already been described[1] is used. It works exceedingly well and, when properly done, will do more than an advancement.

Orthoptics has a wide field in the treatment of phorias but it is not the purpose of this paper to deal with them. Convergence insufficiency is the most responsive to treatment and the psychological effect of giving convergent exercises with a machine is much greater than having them use a test object at home.

CONCLUSIONS

1. Orthoptic training has an important place in the treatment of strabismus. The correct diagnosis of the underlying condition is by far the most important step and the failure to do this is the cause of many disappointing results.

2. The complete occlusion of the good eye until amblyopia and false projection is corrected is the next step combined with fusion training.

3. Surgery on the proper muscle should be done and if necessary followed by fusion training.

4. Strabismus has not been cured by orthoptics alone in the Hospital for Sick Children Clinic.

5. When it is thoroughly understood by the profession that orthoptics is purely one step in the treatment of cross-eyes, it will have much wider acceptance.

REFERENCE

1. MORGAN, A. L.: Surgical treatment of strabismus, *Canad. M. A. J.*, **45**: 500, 1941.

Medical Arts Bldg.

PRINCIPLES GOVERNING TRAINING FOR REHABILITATION*

[*The following article, forming part of the series on Industrial Medicine, consists of selections from the pamphlet written recently by Dr. G. M. Weir and published under the authority of the Hon. Ian MacKenzie, Minister of Pensions and National Health.*]

PURPOSE OF THIS MANUAL

THE present statement is a tentative digest of the main principles underlying training for rehabilitation. This synopsis seeks to portray the highest common factor of agreement on social policy concerning the training of discharged persons with the object of facilitating their re-entry into civil life. General adoption of these principles will, it is hoped, result in a consensus of sound practice relative to rehabilitation matters.

GENERAL PURPORT OF P.C. 5210

Rehabilitation vs. General Education; P.C. 5210 vs. Section 93, B.N.A. Act. — Order in Council (P.C. 5210) is based on two main principles both of which are implicit in its provisions: namely:—Rehabilitation is primarly an opportunity for re-establishment in civil life rather than a reward for service. In the second place, P.C. 5210 envisages rehabilitation (with special regard to training procedures) as in a separate category from general education defined under Section 93 of the B.N.A. Act. This distinction, as will be seen from the following discussion, is an important one both from the point of view of jurisdiction and of training problems,—such as types of organization, their relation to provincial school facilities, administrative procedures and similar matters.

It is a truism, yet an important one, to say that public education, under Section 93 of the

* For previous articles see *Canad. M. A. J.*, **51**: 439, 521, 1944 and **52**: 55, 136, 271, 386, 1945.

B.N.A. Act, falls within the exclusive jurisdiction of provincial governments. Nor was it ever intended that P.C. 5210 should infringe, in the slightest degree, upon the educational autonomy of the Provinces.

OBJECTIVE IS RE-ESTABLISHMENT

In the case of university, as of vocational education, the direct objective of P.C. 5210 is re-establishment. The fact that certain by-products of these training provisions — *e.g.*, health, citizenship, worthy use of leisure, character—are the same as those of general education is merely a coincidence. The point is that, under the Order, the discharged person is not entitled, as of right, to greater assistance than that necessary for his re-establishment in civil life or in that status in civil life, that, within reasonable limits, he would probably have attained had his career not been interrupted by military service.

Border-line cases will inevitably occur and these should be given the benefit of every reasonable doubt. It does not follow, however, either in justice or equity, that these persons are entitled to courses of training out of line with their mental capacities or incompatible with their physical or mental condition. The fact that they did their duty to their country in its hour of dire need—and thus become eligible for specific benefits necessary to their reabsorption in civil life — does not absolve them from the correlative duties of citizenship in time of peace. And the great majority of these youths do not seek special privileges. They do not expect largesse but justice. In so far as possible they ask for the same privileges and training opportunities as would have been theirs had they honourably remained in civil life while others fought the Hun.

The point worthy of emphasis is that P.C. 5210 represents no change in Canadian policy in respect of education,—including adult education. It imposes no disabilities and confers no privileges on prospective trainees or on educational bodies inconsistent with Section 93, B.N.A. Act. The ministrations of federal authorities under the Order are defined and limited by the rehabilitation needs of discharged persons whose civil life was disrupted by military service and who seek reinstatement on the normal occupational highway open to civilians. In the process of assisting in the rehabilitation of these persons it cannot be too strongly emphasized that there is not, nor will there be, any intrusion by federal authorities in the provincial educational domain.

TRAINING ON THE JOB

It has already been pointed out that the chief objective of rehabilitation programs is the specific job at the end of the training; whereas in general education the process of training assumes a relatively major importance. Even in the latter case, however, preparation for an occupation is no longer considered, in this realistic world, an ignoble aim.

It is perhaps axiomatic to state that trainees should be placed in industries where they will probably be employed on the completion of training. True it may be that in some well-equipped plants more employees might be trained than could reasonably be absorbed therein at the end of their training. In such cases, however, arrangements for the ultimate employment of trainees should be made before the completion of their courses. For the above reasons industry should collaborate fully with rehabilitation officials in at least three (3) major phases of training:

1. *Selection and sponsorship of trainees.*—As implied above, the latter should be of the type suited to jobs likely to be available on the completion of training.

2. *Curricula and instruction.* — It should scarcely be necessary to observe that enough theory should be introduced to make practice reasonably effective. In other words, great care should be taken to ensure that training is adequate. Something more than mere practice is involved in adequacy.

3. *Placement, and if advisable, retraining or further training.*—As already stated, training should be for a specific job or occupation and it is desirable to know in advance the job for which the trainee is being prepared. Changes however, both in the intentions and abilities of the trainee and in types of jobs available may indicate the need for additional training, whether to improve the status of the trainee or to enhance the output of his work, or probably for both purposes.

TRAINING ON THE JOB VS. TRAINING IN SCHOOLS

There is a consensus among business executives, as among psychologists, that training in plant schools — which are not "formal"

schools but do provide a measure of instruction in addition to supervision of trainees by plant foremen or supervisors — and corresponding training in regular vocational schools, as administered by boards of trustees, are complementary. After the last war over 50% of those given vocational training were trained, with fair success, in industrial and commercial establishments. Moreover psychologists agree that over 80% of the simpler skills are best learned on the job with supplementary training, if feasible, in the plant school or in the local vocational school.

According to the majority of industrialists, whose opinions are based on solid experience, the chief attribute of the vocational school is that it provides "general training (theory plus shop work)" in a reasonably efficient manner. This basic or "background" training is alleged to be "more concentrated and thorough" than the training provided solely on the job. These views are in conformity with those of industrial psychologists who recommend that both types of training should be used wherever feasible. For example, as intimated above, in some cases those learning on the job in the daytime might avail themselves of the opportunity to attend late afternoon or evening classes in the local vocational or technical school.

COMMON SENSE AND COUNSELLING

The need for guidance is self-evident. Out of the first 347,900 men who enlisted in the Armed Services only 27,000 had definite choices of occupations after their discharge. About 212,000 had preferences but no specific choices; while 108,000 had neither choices nor preferences. As a result of their training and experiences while in the Services, many of these men will have changed both their intentions and their skills. Perhaps half of them will return to their former jobs or to other jobs awaiting them, while many others will prefer not to avail themselves of counselling services. Border-line or problem cases, however, as well as those seeking guidance in preparing for their life callings, will probably constitute a sufficient number to tax the resources of the Department's counselling services.

It is the intention of the Department, and concrete steps in this regard have already been taken, to have available at the various discharge centres an adequate number of competent guidance personnel. These counsellors obviously need training which fortunately can be acquired. But they also need, at least in equal degree, common sense which is a gift of nature rather than a scholastic acquisition. Of three indispensable attributes of the successful counsellor—training, experience, and common sense—the latter, and in as massive proportions as possible, is probably the most indispensable.

MUST CONSIDER LIMITATIONS

Limitations in intelligence imposed by heredity are as inexorable as those imposed by hereditary lack of common sense. For instance, a so-called "dull-normal", long on attractive physique but short on mathematical abilities or capacity for thinking, should be discouraged from registering in technical engineering, medical, legal or similar courses that require considerable powers of abstract reasoning. Even distinguished service does not, of itself, confer academic distinction. Bravery in the Services does not generate brains in the mastery of courses of training. And the counsellor who yields to the importunities of discharged youth, or who permits other undue pressures to distort his best judgment in offering vocational counsel, is doing a serious disservice to the prospective trainee. Mistaken indulgence or supineness in such matters may result in gross injustice to the trainee.

Ideally, of course, as is the case in the best of modern school systems, vocational guidance should be considered a vital aspect of general education;—that is, of education concerned with the living of a finer life as well as with the earning of a living. But the post-war situation will be an emergent one arising out of the crucial need for the early re-establishment of discharged youth. Thousands of the flower of Canada's young manhood and womanhood will be anxious to achieve an even occupational keel at the earliest opportunity. They will be restive to get back to civil life and will chafe at any delays irrespective of their causes. So imminent indeed will these rehabilitation pressures probably become that vocational counsellors may, especially in the early months after the war ends, have time to deal with only one segment of the vocational guidance program,—namely, that of occupational counselling. This does not mean that tests and other techniques will not be available, especially for

problem and border-line cases and for those who desire a more thorough diagnosis than that represented by the trainees' service documents.

SHOULD ENCOURAGE EMPLOYMENT

Generally speaking, however, discharged persons who are fit and able to take suitable jobs should be encouraged to do so forthwith. Training on the job and in various commercial and financial institutions will probably serve, as already stated, as a rehabilitation outlet for perhaps half or more of the discharged persons. Such training, however, will entail considerable follow-up and supervisory procedures for probably three to six months after placement. All these services will require both group counselling, where feasible, and numerous personal interviews that will doubtless tax the time and capacities of a large counselling personnel if such activities are not to be unduly retarded or prolonged and if excessive maladjustments of trainees are to be avoided.

THE "PUBLIC INTEREST" AND REHABILITATION

A perusal of P.C. 5210 indicates that, while benefits for discharged men and women under this Order are not to be regarded as deferred pay or as a reward for service but rather as an opportunity for civil re-establishment, the Order in Council is based largely on considerations of equity.

Closely allied to considerations of equity is that somewhat vague principle of the "public interest". For instance, under Section 9 (P.C. 5210) the Minister of Veterans' Affairs may, after consideration of the applicant's "attainments and his course", authorize the extension of training grants on the ground that the Minister "deems it in the public interest that he should continue such course . . .". Now any Minister ordinarily acts on the advice of his responsible officials. Hence it becomes the paramount duty of supervisors, counsellors, rehabilitation boards and officials of the Department of Veterans' Affairs — while zealously safeguarding the personal interests of the discharged person and giving him or her the benefit of every reasonable doubt—not to ignore the dictates of the "public interest". Theirs is the important responsibility of dispensing even-handed justice between Mr. John Q. Citizen, the taxpayer, and the prospective beneficiary of assistance under P.C. 5210. Hence it is clearly desirable that there should be some consensus among the above officials in respect of the main ingredients comprising that elusive doctrine of the "public interest".

NEED NOT BE EXCLUSIVE

The "public interest" and the individual interest of the applicant need not be mutually exclusive. On the other hand, both the above interests may coincide, and, in fact, frequently do. For instance, in Canada there is a serious shortage of dentists. In the "public interest" the number of good dentists might well be increased by 200%. Likewise, more doctors, engineers, public health nurses, social workers, highly qualified teachers, laboratory technicians, physiotherapists, trained agriculturists, skilled carpenters and similar people are needed. To train them would obviously advance the "public interest", provided the best type or a reasonably good type of material were selected for training. This training would also promote the individual interests of most of those so trained. Moreover, the social need may place a priority on the training of nurses or doctors, for example, in preference to training prospective members of some other professions. Also, social need, or "public interest", cannot safely be divorced from considerations of individual ambition and merit. Good intentions of prospective trainees to help their fellow humans by becoming competent dentists or nurses or teachers, for instance, are, while quite praiseworthy, often far from adequate. Determination to achieve must be supported by ability to achieve.

In the final analysis, any valid interpretation of "public interest" must place social need above individual preference. Generally speaking, it is not in the "public interest" to use public funds in the attempt to train inferior or mediocre ability for highly skilled trades or the learned professions. Mediocre intelligence is scarcely competent to do advanced undergraduate or postgraduate work satisfactorily. Applicants for postgraduate training under Section 9 should be good scholarship material. They should be selected with the same discriminating judgment as universities and provincial departments of education use in selecting prospective scholarship holders.

Similar observations regarding the field of vocational training would also be relevant.

Vocational training should not be considered merely as a matter of right under P.C. 5210—people of goodwill seldom seek tangible awards for doing their moral duty—but should also take into consideration the real welfare of the individual in question, *e.g.*, his abilities, aptitudes, experience, educational background, health, character and other determining factors that promote or retard success in an occupation.

SUMMARY

1. Training under P.C. 5210 is definitely and directly concerned with (re) establishment of trainees in post-war jobs and should not be confused with general education as training covers only a segment of the general education field.

2. While P.C. 5210 is perhaps more comprehensive and generous in its provisions than any similar enactment, its terms,—while the trainee is entitled to the benefit of any reasonable doubt,—should be interpreted primarily in the light of justice (the "public" interest, as well as the "private" interest of the trainee) rather than of generosity which may give undue regard to considerations of assumed "private" interest.

3. Industry should, in a general way, collaborate with rehabilitation officials in at least three phases of training: (*a*) selection and sponsorship of trainees for the specific industry concerned; (*b*) curricula and instruction—in order that the training may be more closely related to the practical needs of the industry in question and of similar industries; (*c*) placement of trainees and their subsequent supervision or retraining.

4. Training officials should use both industrial plants (including plant schools) and vocational schools. The proportions of relative use (*i.e.*, plant training on the job and training in vocational schools) will vary in different communities. Probably well over half the trainees should be trained on the job; but supplementary use should also be made of vocational schools wherever feasible.

5. The successful vocational counsellor is ordinarily endowed with a massive common sense, sound training, and high moral courage. He should not forget his function as guardian of the "public" interest as well as of the private interest of the trainee. (These observations also apply to other rehabilitation officials.)

6. Rehabilitation should be regarded primarily as an opportunity—which, under conditions as explained in the above context, may also be considered a right—for establishment or re-establishment in a satisfactory post-war job. It should not be considered as a reward for military service.

Case Report

RELIEF OF ASTHMA BY SULFA THERAPY

(Report of Two Cases)

By Major W. W. Bell, R.C.A.M.C.

The presentation of these cases is not with the idea of suggesting that the sulfa drugs are a cure for asthma but simply to record the fact that two severe cases obtained relief through its use.

CASE 1

A.D., a nurse, aged 48.

Past history.—This nurse had had hay fever in early life but never noticed any particular plant or epidermal as being a causative agent. In 1921, she had a left-sided thoracoplasty done (for tuberculosis), in which nine ribs were sectioned. She became sputum free and her other lung remained well. About 1924 she developed true asthma. The attacks occurred at long intervals, lasted a varying length of time from a day or two to three weeks and were relieved by adrenalin. She stated that she had had every known scratch test during subsequent years but an activating agent had never been found.

In April, 1940, she came in complaining of being too easily fatigued and wanted her chest x-rayed. Films were taken and showed no evidence of active tuberculosis but her red cells were found to be 2,950,000, with hæmoglobin of 43%; sedimentation rate was 14 (Cutler). All other systems were essentially negative. She was put on iron therapy, diet and extract of liver, the injections being given at weekly intervals, later once a month.

She improved clinically; sedimentation rate dropped to 5 mm., red cells rose to 4,160,000 by October, 1940, and Hgb. to 68% but could never be got above that figure, and frequently slipped back to 63 or 60%.

In October, 1940, she developed a very severe attack of asthma and had almost no relief from adrenalin in either aqueous or oily solution. As she had had many scratch tests, without results, further tests were not made but clinical examination revealed paranasal sinuses that were dark on transillumination and cloudy by x-ray. Smears of the post-nasal discharge showed heavy growth of streptococci and it was decided to try sulfa therapy.

To bolster her hæmoglobin against probable reduction during sulfa therapy she was given 2 c.c. anahemin, B.D.H., 24 hours before starting the sulfonamide. She was unable to retain sulfanilamide or thiazole but diazine was well tolerated. Within 24 hours there was a distinct alleviation of symptoms and in 48 hours there was a dramatic subsidence of signs and symptoms. The sinuses also showed improvement. Treatment was continued for 10 days, three days after the disappearance of all signs and symptoms and she had no recurrence.

Following cessation of the diazine treatment her red cells were 3,960,000 with Hgb. of 58%. Not knowing what reaction to liver might be expected three weeks were allowed to elapse before giving further anahemin. At that time 2 c.c., anahemin was given in the gluteal muscle. Within thirty seconds she broke out in hives from head to feet accompanied by painful tingling sensations in her arms and legs and slight tingling all over. One c.c. of adrenalin was given at once and the hives disappeared. Iron therapy and special diet were continued. One month later the red cell count was 4,160,000 with Hgb. 74%; 2 c.c. anahemin was given as before and was followed by tingling in fingers and toes but no hives. Red cell count and Hgb. rose steadily and three months after the sinuses had cleared her counts were 4,600,000 and 92% Hgb.

This patient has been seen several times during the succeeding years and on only one occasion did she have symptoms suggestive of recurrence of asthma. Prompt treatment of the sinuses at that time aborted the attack before the asthmatic symptoms became established.

CASE 2

W.T.M., aged 58. This patient has had hay fever or asthma as long as he can remember. Following removal of tonsils and adenoids in 1921 he had several years of only mild symptoms and at infrequent intervals. In 1932 he had a number of nasal polypi removed and symptoms of asthma were absent until 1935 when he had a severe attack. At that time iodides were given by mouth and intravenously with dramatic relief of symptoms. A subsequent attack in 1939 was not relieved by iodides. In 1940, during an attack, his left antrum was punctured and washed but he did not feel that the asthma was materially relieved. In June, 1944, he had a brief but severe attack which started at the end of a 2-hour plane flight and was relieved the following day while flying back to his base. Thereafter attacks occurred at shortening intervals and with increasing severity. He spent several days in hospital on the West Coast, and was then moved inland in the hope that a higher altitude would prove helpful.

He was admitted to hospital November 27, 1944, and it became immediately apparent that he was having a very severe attack of bronchial asthma complicated by right heart strain. He had been taking adrenalin by hypo and nasal spray with lessening relief and increasing cardiac complication.

He also reported that he had had numerous scratch tests without finding a specific allergen. Examination revealed nasal polypi, and paranasal sinuses that failed to transilluminate. The latter was confirmed by x-ray. Smears from the nasal discharge and from mucopurulent sputum showed many streptococci present and on culture these proved to be mainly hæmolytic with some non-hæmolytic organisms.

Adrenalin was discontinued shortly after admission. Aminophyllin was given with relief of asthma but with further discomfort to the heart. An electrocardiogram demonstrated the Mokatoff-Wilson syndrome of right heart strain. At the end of 48 hours on aminophyllin and sedatives, including morphine, nembutal, codeine and phenobarbital, it was apparent that his asthma was not improving and his heart was definitely weaker. All other medication was stopped and sulfathiazole was given to a total of 120 gr. in the first 24 hours and 60 gr. daily thereafter for several days and then by gradually diminishing doses.

Within the first 24 hours on sulfathiazole the patient remarked how much better he felt. At the end of 48 hours the improvement was so marked that he was considered fit to screen and x-ray. The findings confirmed the clinical and electrocardiographic picture. The heart sounds were still very faint and distant but were now audible at base and apex. The asthmatic wheeze was much reduced and râles and rhonchi were very much reduced. Sputum was present, about 2 cups per day, but had lost its mucopurulent character and was mainly glairy mucus, very tenacious. Repeated electrocardiograms showed the heart to be improving along with the general improvement, and on December 14 what was considered to be approaching a normal tracing was obtained. On December 15 the patient was transferred to a hospital in Eastern Canada.

DISCUSSION

It is admitted that neither case was "proved" by the isolation of an allergen from sinus discharge and subsequently using it to precipitate an attack. Further, in the second case, the history showed that attacks had been precipitated by outbursts of anger, acting as a trigger mechanism, and by excessive fatigue. Altitude did not appear to be a factor in either case. Aminophyllin, in the second case, while easing the wheeze was definitely hard on the heart and the patient finally refused to take any more of it. Both patients volunteered the remark that they had never experienced such prompt relief from any other agent.

SUMMARY

1. Two cases of severe bronchial asthma are presented, each of which was adrenalin-resistant and each of which showed paranasal sinusitis with streptococci as the main organism of infection.

2. The second case was complicated by severe right heart strain.

3. Both showed dramatic response to sulfa therapy.

4. It is not suggested that either of these cases was "cured" with the sulfonamide treatment but each received marked benefit at the time and in the second case it appeared to be a life-saving agent.

Use of vaccines against the common cold should be regarded as experimental and limited to suitable groups. Their general promotion and distribution is wasteful and should be discouraged.—Council on Phar. & Chem., *J. Am. M. Ass.*, **126:** 895, 1944.

Special Article

EPIDEMIC JAUNDICE

(A Review of the Literature)

By Howard Mitchell, M.D.

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Jaundice, sporadic and occasionally epidemic, under civil circumstances is a familiar condition. During war time it has been long recognized that this disease is prone to become more prevalent, particularly affecting armies in the field. Reference to the relation between war and jaundice has been made during most of the conflicts of modern times, by contemporaneous observers. That the present war exhibits the same phenomenon is already manifest.

Increased interest in this very important and in many respects puzzling problem has been inevitable. In addition to the epidemiological aspects confronting military physicians, in relation to the infection as it occurs naturally, allied and closely related matters have arisen. These are chiefly, the observation that jaundice of an infective nature has been transmitted by inoculation of vaccine containing human serum, by homologous serum transfusions, and following the use of immune human convalescent measles serum, or human mumps convalescent plasma; the increased incidence of jaundice in patients receiving anti-syphilitic treatment has aroused much interest and speculation. Finally the micropathology of non-fatal and fatal cases has been extensively studied.

The concept advanced by Virchow that the disease is primarily an infection of the bile ducts ascending from the duodenum has been proved untrue; at any rate this holds for the vast majority of cases, attempts to demonstrate the mucous plug of Virchow having failed. It has been shown that the icterogenic agent cannot be demonstrated by ordinary bacteriological methods. It passes through a Seitz filter pad, withstands 0.5% phenol, and cooling, but not heat. Biopsy and autopsy studies show the histological lesion to be one primarily affecting the liver cells. Reference will be made later to the pathological characteristics. The term "catarrhal jaundice" therefore is a misnomer; "epidemic", "infective", or "infectious", "hepatitis" is preferred, as indicating more precisely the nature of the characteristic lesion; the name "epidemic hepatitis" is recommended by American army investigators.

The incubation period of the common epidemic form of jaundice is generally accepted as being about four weeks. At the onset the symptoms, which vary considerably in intensity in different individuals, include low fever, malaise, headache, irritability, depression, anorexia, backache, discomfort in the epigastrium or right subcostal region, flatulence, and sometimes mild diarrhœa. The urine becomes dark and clinical jaundice appears.

Duration of the prodromal period varies. In Lucké's[3] series, in the majority, seven days or less elapsed before jaundice was seen. The only pathognomonic clinical sign is the appearance of the jaundice; at times difficulty is encountered during the prodromal period in accounting for presenting complaints. Malaise is usually general, sometimes chiefly of the limbs. Headache is not usually severe but backache frequently is; anorexia may be complete but in any event is usually more pronounced for fatty greasy foods. Nausea is often very distressing but vomiting is infrequent in the early stages of the disease. Abdominal discomfort is felt in the epigastrium, or under the right hypochondrium and may be referred to as a sensation of fulness or tightness.

In some instances defervescence occurs towards the end of the prodomal period with amelioration of constitutional symptoms; then after a short apyrexial period of one to a few days, jaundice supervenes. The liver is tender on palpation and usually somewhat enlarged. The spleen in the majority of uncomplicated cases is not palpable. Bile is present in the urine before clinical recognition of jaundice; with the development of frank jaundice most symptoms abate. Itching is not complained of nearly as frequently as in many types of obstructive jaundice; the stools may be but are not always acholic.

Commonly, jaundice persists for a period of from a few days to 3 to 4 weeks. The clinical course is essentially benign, the principal serious hazard being that of progression to acute or subacute yellow atrophy. The death rate in large series ranges up to 0.4%. Less serious are the small number who develop ascites and some who may proceed to permanent cirrhotic changes.

Death seldom occurs in less than two weeks from the onset of symptoms, but may take place with rapidity in the course of a few days after the appearance of jaundice. Ordinarily defervescence follows development of jaundice. Persistence of fever, the occurrence of cerebral manifestations (drowsiness, irritability, confusion, disorientation), ascites, persistent vomiting, or sudden decrease in the size of the liver should be regarded as of unfavourable prognostic importance.

TREATMENT

Treatment is empirical and symptomatic. It is probably wiser to insist on complete bed rest at the onset although opinion does not agree as to the optimum period desirable. External heat to the epigastrium or back may be more comforting than anodynes. Analgesics or sedatives with hepatotoxic properties should be avoided. Fats are not well tolerated until convalescence is established. The diet most acceptable at the

onset is one of clear liquids. Later solid carbohydrate and protein may be added. In toxic cases intravenous fluids and glucose may be necessary to maintain fluid balance and prevent dehydration. Alcohol should probably be forbidden entirely until full recovery is assured.

Convalescence is much more tedious and protracted than might be expected from the generally benign clinical course; six weeks to three months may elapse before mental and physical performance reaches normal levels.

Before dismissing the clinical part of the disease it must be mentioned that considerable opinion supports the view that infection may occur without clinical jaundice. Certain epidemiological observations certainly support this view, and as will be shown later, characteristic histological changes appear in the liver before jaundice can be demonstrated. This is an additional reason for discarding "jaundice" from the nomenclature of the disease, and it no doubt partly explains the difficulty in establishing contacts and transmission of the infection.

PATHOLOGICAL CHANGES

Iversen and Roholm[1] investigated the liver changes in non-fatal hepatitis, using material obtained by aspiration biopsy. Dible, McMichael and Sherlock[2] confirmed and extended this work by the study of specimens from 56 cases of hepatitis, 14 occurring in epidemic hepatitis, 35 in individuals undergoing arsenotherapy, and 7 in patients who developed jaundice following injection of human mumps convalescent serum. Mortality following liver biopsy is said to be about 1%, due to hæmorrhage. This complication is most likely to occur in very anæmic and deeply jaundiced persons.

The basic findings consist in degeneration of liver cells, and infiltration of inflammatory cells. Cellular necrosis is most marked in the centre of the lobules and seems to spread outwards; infiltration is greatest in the portal tracts and seems to spread inwards. The reticular framework of the lobule is retained.

Complete recovery may follow very severe lesions, 12 out of the 56 non-fatal cases showing damage of more than 50% of the liver cells. The process may continue to a fatal issue with acute or subacute hepatic necrosis. When the disease is prolonged fibrotic changes may give rise to classical cirrhosis; mild residual cirrhosis may persist for some time, probably clearing up later.

An important point is that pathological changes with inflammatory and degenerative features take place before the clinical appearance of jaundice, during the period of prodromal symptoms. No histological differences were observed between cases of epidemic jaundice and those in which jaundice followed arsenotherapy, or injections of human serum or plasma.

Lucké[3] studied the pathological lesions in 125 fatal cases occurring in U.S. army personnel and civilians in 1942. Findings in the liver in these fatal cases were typical of yellow atrophy; and, in his opinion yellow atrophy represents the final stage in fatal epidemic hepatitis. Characteristically, destruction affects only the liver cells, the reticular framework and sinusoid remaining unaltered. Through the framework are scattered lymphocytes, plasma cells, granulocytes and macrophages, the relative proportions varying from case to case and with the duration of the disease. Scarring is absent, cellular debris is removed rapidly.

No evidence occurs of fatty changes or coagulation of cytoplasm as seen in atrophy due to chemical poisons, bacterial toxins, yellow fever or eclampsia. In fact, rapidity and completeness of cellular destruction is a distinguishing feature of epidemic hepatitis. Changes usually if not always begin in the central part of the lobules. All but the largest hepatic veins are the site of endophlebitis: a feature seen particularly in the lobular and sublobular veins and being an event which may take place in other destructive processes involving liver parenchyma. Ascites occurred in 60% of fatal cases.

The spleen was of normal size in about 25%, enlarged in the remainder, weighing between 200 and 400 grams in 67%. Extensive phlegmonous inflammation with massive œdema involving chiefly the ileo-cæcal regions occurred frequently and was considered a terminal event and was always associated with ascites. The kidneys showed a picture of cholæmic nephrosis. In the brain there was an acute non-specific degeneration of ganglion cells and a mild meningoencephalitis in about 15%. Hæmorrhage was found particularly in the lung, intestine, epicardium, endocardium and kidney.

The liver being important in the metabolic disposal of sex hormones, their retention in excessive concentration may possibly damage the sperm-forming cells of the testis. This proposition was put forward by Klucké, who noted testicular atrophy in several of his cases. It is probably of no importance in the majority of mild instances.

Reference has been made to "serum" jaundice. It is reported that 28,585 American army soldiers were affected in 1942; and many civilians in Brazil, and elsewhere. In all these instances the source was apparently related to certain batches of human serum used in preparation of yellow fever vaccine. (Findlay and Martin[4] state that in Great Britain since 1937, by inactivating the serum at 56° C. for 30 minutes and using donors who remain free from jaundice for at least a month after the serum is withdrawn, no further cases have occurred).

Similar instances of "serum" jaundice have followed the use of measles, or mumps, convalescent serum, and blood transfusion. One of the chief recognizable differences between this and the epidemic type lies in the incubation period. In the latter it is about 4 weeks; in

the former 2 to 4 months. Also, it is remarkable that infection under natural conditions does not seem to occur in "serum" jaundice, although the presence of an icterogenic agent in the naso-pharyngeal washing of icteric and pre-icteric cases was claimed by Findlay. Voegt, using human volunteers, and working with epidemic hepatitis has reported the transmission of an icterogenic agent from duodenal washing orally administered; and blood and serum given subcutaneously and intramuscularly. Andersen in Denmark claimed to have infected pigs with material from human cases. This latter point has not been confirmed by any other investigators. There are several apparently successful experimental transfers of the disease to humans, but no animal has been found susceptible to infection.

Why jaundice is seen so often in patients undergoing arsenical treatment, and its relation in these cases to epidemic hepatitis, is unknown. Histologically the lesions are indistinguishable from those of serum jaundice or epidemic hepatitis. There are two possibilities commonly proposed: that the disease is actually epidemic hepatitis, its development being predisposed by the toxic effect of arsenic upon liver cells; or that the disease is "serum" jaundice transmitted by syringe contamination.

It is obviously of importance to use, except in emergency, serum or plasma which has been obtained from donors who remain free from jaundice for a period (*e.g.*, one month) after withdrawal of the serum. By recording serial numbers of serum, plasma, or blood, contaminated batches can be detected. In clinics syringes should be sterilized between patients, as it has been shown that simply changing needles is insufficient to prevent transmission of infection.

REFERENCES

1. ROHOLM, K. AND IVERSEN, P.: *Acta Path. Micro. Scand.*, **16**: 427, 1939.
2. DIBLE, J. H., MCMICHAEL, J. AND SHERLOCK, S. P. V.: *The Lancet*, **2**: 402, 1943.
3. LUCKÉ, B.: *Am. J. Path.*, **3**: 471, 1944.
4. FINDLAY, G. M. AND MARTIN, N. H.: *The Lancet*, **1**: 678, 1943.

232 Portland Ave.,
Model City.

In the half century to come the health officer must not be solely interested in syphilis and tuberculosis, or even in heart disease and cancer. He must, more and more, concern himself with nutrition in its subtle and complex influences upon vigour and efficiency and satisfaction. The absence of vitamins or iodine or fluorine in the diet of a community may seem as important as the presence of typhoid bacilli in its milk supply.—C.-E. A. Winslow, *Am. J. Pub. Health*, **35**: 196, 1945.

Venereal Disease Campaign

Penicillin and Venereal Diseases

GONORRHŒA

Today, penicillin is the drug of choice for the treatment of gonorrhœa. The recommended dosage for male patients is 100,000 units given intramuscularly in divided doses over a period of 8 to 15 hours, and for female patients 300,000 units given intramuscularly in divided dosage over 36 hours.

SYPHILIS

The treatment of syphilis with penicillin is still in the experimental stage.

Preliminary results indicate that the amount of penicillin required for the treatment of early-acquired syphilis, in the primary and secondary stages, will not be less than 2,400,000 units.

Little is known yet of the value of penicillin for the treatment of latent syphilis and of the various forms of late syphilis.

MASKING OF SYPHILIS

The amount of penicillin required for the treatment of gonorrhœa (much smaller than amount required for treatment of syphilis) can delay or even, possibly, prevent the appearance of the primary lesion of syphilis in the event that the patient may have contracted both gonorrhœa and syphilis at the same time. This amount of penicillin may also delay the occurrence of the positive serological test for syphilis in such a case. Therefore, it is of extreme importance to perform a serological test for syphilis three months after the completion of treatment of every gonorrhœa patient treated with penicillin.

An Absolute Essential

No case of syphilis has been completely assessed without a *C.S.F. examination.*

Neurosyphilis (asymptomatic) cannot be detected without *C.S.F. examination.*

"Find V.D. Contacts — Report V.D. Cases"

Clinical and Laboratory Notes

LYMPHOEPITHELIOMA OF THE NASOPHARYNX

By Joseph Gollom, M.D.

Toronto

A great deal of confusion seems to exist as to the nomenclature and biological nature of malignant tumours of the upper respiratory tract. The majority of opinions include lymphoepitheliomas among the non-keratinizing group of epithelial tumours, while others regard them as a form of reticulum cell sarcoma.[1]

According to Frank, Lev and Blahd[2] this tumour consists of a mass of moderately large cells, with indistinct cell borders. In some regions the cells are closely approximated, simulating epithelium. In others they are loosely arranged and resemble reticulum cells. The nuclei are pale and round or oval. The cytoplasm is moderate in amount and bluish-pink. There is a marked difference in size and shape of the cells, and numerous mitotic figures are noted. A scattering of lymphocytes is present. It is highly malignant.

The chief primary sites are the orifice of the Eustachian tube, the posterior nares, the vault of the pharynx and the tonsillar areas. In these regions the mucous membrane is interlaced with lymphoid tissues and is referred to as lymphoepithelium.[3]

Persky[4] and others point out that the lymphoepithelioma grows slowly at its primary site, but metastasizes early. The condition manifests itself roughly in the following order:

1. The appearance of slowly enlarging glands on one or both sides of the neck. New found this as the first clinical symptom in 42% of 194 patients with nasopharyngeal tumours. Sooner or later it occurs in the majority of cases.

2. The appearance of signs and symptoms due to the primary growth such as nasal obstruction, epistaxis and nasal discharge. Obstruction of the Eustachian tube by the growth produces a sense of fullness in the affected ear, as well as pain. There may be tinnitus and progressive deafness of varying degrees.

3. The appearance of signs and symptoms due to intracranial extension. The tumour may enter the cranium by passing through the foramina, such as the foramen lacerum, which lies about 1 cm. from the fossa of Rosenmuller. According to Martin[5] the tumour may invade the skull directly as well, producing destruction of any of the bony structures making up the roof of the pharynx. He states that careful x-ray studies of the skull in the vertical and lateral positions should be carried out in all patients with the disease. The dura is pushed upward but is practically never invaded.

A vertical section through the middle fossa shows the nerves to be placed in the following order if one reads from below upwards: abducens, branches of the trigeminus, oculomotor, trochlear and optic nerves.

A review of 234 cases studied by 5 clinicians[6] shows that the occurrence of nerve symptoms due to extension of the tumour into the middle fossa follows this same order.

4. Generalized metastases below the clavicles often occur fairly rapidly in the chest, then in the bones, liver, kidneys, spleen and retroperitoneal lymphnodes.

Treatment. — Lymphoepithelioma and related malignancies of the nasopharynx do not lend themselves to successful surgery. X-ray therapy in divided doses following the Coutard method is the treatment of choice, and several groups have reported 5-year cures in nasopharyngeal malignancies, including lymphoepithelioma, in as high as 25% of cases.

Chas. Martin follows a plan which not only irradiates the primary area, but also the regions where metastases are likely to occur, even though no metastases are detected at the initial visit. (1) He covers wide areas on each side of the pharynx, including the base of the skull, the submental area as well as the upper portions of the triangles of the neck. He averages 3,200r on each side during a period of 3½ weeks. (2) When the reaction from this series has subsided, the base of the occipital region and the back of the neck receives 3,000 roentgens at the rate of 300 per day. (3) At about the same time 2,400 roentgens are delivered through 15 cm. portals to the front and back of the upper mediastinum at the rate of 300 roentgens per day in an effort to forestall downward extension through the lymphatics in this region.

CASE REPORT

L.Y., aged 38, Chinese, male. In June, 1943, this patient had two left lower molars extracted. In October, 1943, patient developed sharp stabbing pains in the left cheek. These pains increased in intensity and frequency. From November, 1943, he found increasing difficulty in opening his mouth. From January, 1944, patient developed left nasal blockage; then swelling and numbness of left cheek.

He was treated for a while as a case of arthritis of the left temporo-mandibular joint. Seen by me on March 14, 1944. The jaws could be separated about ¼ inch maximum. He had lost considerable weight. There was roughness, scarring and an upward distortion of the left soft palate. The left cheek was swollen and firm; but no lesion seen. There was a good deal of ulceration of the left Eustachian orifice and left Rosenmuller's fossa.

Biopsy from soft palate reported as lymphoepithelioma. Biopsy from nasopharynx indefinite.

Referred to the Ontario Institute of Radiotherapy. Treated with fractional doses of deep x-ray, 400 kv. from March 30 to June 9. Almost daily treatment.

Several months later there was no sign of ulceration or growth in either palate or nasopharynx. The Eustachian orifice is sealed off.

In addition x-rays of the skull and the chest are negative for metastases.

REFERENCES

1. HARVEY, W. F., DAWSON, E. K. AND INNES, J. R. M.: Debatable tumours in human and animal pathology. I. Lymphoepithelioma, *Edinburgh M. J.*, 44: 549, 1937.
2. FRANK, I., LEV, M. AND BLAHD, M.: Transitional cell carcinoma of the upper respiratory tract, *Ann. Otol., Rhin. & Laryng.*, 50: 393, 1941.
3. CLOWARD, R. E.: Nasopharyngeal cancer, *Arch. Otolaryng.*, 32: 512, 1940.
4. PERSKY, A. H.: Lymphoepithelioma of the nasopharynx, *Arch. Otolaryng.*, 37: 813, 1943.
5. MARTIN, C. L.: Cancer of the nasopharynx, *Ann. Otol., Rhin. & Laryng.*, 52: 146, 1943.
6. *Ibid.*

425 Bloor St. W.

Editorial

JUSTICE AND THE FUTURE OF MEDICINE

IN a recent address to the American Urological Association,* Mr. Wendell Berge, the Assistant Attorney-General of the United States, analyzed very clearly the trends towards change in methods of medical care.

First he paid tribute to medical men for the work of the profession throughout the centuries. But not only has the doctor to deal with the most complex of all organisms, man, he has also to use an extremely complex system to carry on his medical service. There is the technology of medicine on one hand, diagnosis and treatment (and all that these imply) and the organization of medicine on the other, that is, all the arrangements, social and economic, by which medical service is made available. "It is idle," said Mr. Berge, "to dispute as to which is the more important; for there must be a medicine to practice and there must be some sort of arrangements for bringing physician and patient together. It is no veiled mystery to tell you which is the more backward. In the advance of the arts of medicine you have done a brilliant job. In the face of this advance it is all the more tragic that progress in the organization of medicine has lagged—and because of this lag, the nation has not had the full benefit of your superlative performance".

Now, it is in the recognition of these two aspects of medical care and their harmonization, that Mr. Berge finds the problem to be. He shows that "private practice of medicine" does not actually exist. The doctor holds no public office, but his service, as the judges put it, "is clothed with public interest". Medicine is the instrument of common health. It is not called a trade in circles of justice, but circumstances can arise in which doctors can be charged with carrying out a restraint of trade, as was done in the suit of the U.S. against the A.M.A.

Then there are the various trends of modern civilization as regards medicine: the enormous multiplication of medical technical methods, which have done away almost entirely with the old-fashioned family doctor; the trend in the community towards demands for adequate medical service: the obvious gap in the apportionment of all the medical service rendered in accordance with the general need; those who are rich get all and even more than they need, those in moderate circumstances are too heavily penalized for illness, and the poor must depend on charity and all its uncertainty.

A new medical order is inevitable, and Mr. Berge reviews the fears of the profession as to what may result. Will the quality of service be impaired? Why should it be necessarily worse? Is it not rather that a new system would bring medical care to hosts of people who before had no access to it? (The rather too clever argument is used by Mr. Berge that there can be no falling off in quality for these last, as they never had any service before.) The personal relationship between patient and doctor is never likely to be encroached on. The right of choice of physician is looked at from the patient's point of view and it is urged that he is only an amateur in this respect and all too frequently makes costly mistakes: "Competence does not wholly accord with ability to attract patients, as in law it does not always rest on ability to attract clients. . . . Far more important to the patient is the assurance of a high standard of competence."

Why should salaried doctors do less or poorer work than under the present system?

* Justice and the Future of Medicine, *J. of Urol.*, 55: 375, 1944.

Does not the government employ multitudes of highly skilled men who give their best? High standards must be insisted on but Mr. Berge feels that these are a professional matter and are not inherent in any type of organization. Medicine under the present system has its own insidious dangers just as state medicine has.

If any conclusion is to be reached in this argument Mr. Berge says, it is this: that it is not a question of "private practice" versus socialized medicine. The problem is how to furnish the whole population with adequate service, on terms it can afford; and all the varieties of medical services should be used to further the common health. But protection against the undesirable possibilities of control must be set up.

We have given this very sketchy summary of an exceedingly interesting address in order to add to the evidence that our profession is facing change to which it must adapt itself, perhaps not quickly nor yet completely, but certainly to some extent. And it cannot do this without continually thinking over the problems involved and striving to educate the public to appreciate their meaning.

Editorial Comments

The Annual Meeting in Montreal

There are those who feel that the advisability of holding medical conventions under the present war conditions is open to question. No one disputes the intrinsic value of these conventions, their direct benefit to both the military and civil medical effort, and their indirect value in sustaining and raising medical standards for the future. The criticism is directed rather toward the present effect of conventions in adding to the recognized difficulties of transportation and housing. These difficulties exist no doubt, and there has been full realization of this. At the same time the Association has not received any intimation from official quarters that the convention should be cancelled. Nor has there been any representation from the hotel or transport authorities that they cannot handle the business. On the contrary, we have been assured that at the moment the outlook for meeting the demands of the meeting is quite satisfactory. So far as the convention itself is concerned, arrangements are well advanced, and a highly satisfactory meeting is contemplated.

It may be added that those intending to attend the meeting in June can materially ease the strain on the hotels by reserving their accommodation at the very earliest possible date. Details of the meeting will be found on page 515.

The Editorship of L'Union Médicale

Dr. Albert LeSage has recently retired from the editorship of *L'Union Médicale*. He has held this post for 44 years, a long period of service in any position, and unusually long amongst medical editors. In that time he has shown the ability and tenacity of purpose which have served to sustain *L'Union Médicale* throughout more than half of its life as the oldest existing Canadian medical journal, and we should like to pay our tribute of respect for his long and valuable work in upholding high standards in Canadian medical journalism.

Johns Memorial Fund Established

The Hippocratic Society of the University of Western Ontario Medical School has initiated, in memory of the late E. P. Johns, M.D., a fund for the annual purchase of books to be presented to the Medical School Library. These books will not be the usual run of revisable textbooks but rather volumes of lasting interest and value. This collection will be kept as a unit in the library and each book will have on the inside of the cover a bookplate bearing a picture of Dr. Johns.

The Hippocratic Society will give an annual sum of fifty dollars to the fund, and it is hoped that with the help of the Alumni it will soon reach a proportion large enough that the annual income will procure a suitable number of books. Already the library is in possession of several books which will start this collection.

It is a most sacred and obligatory function of a university to impart knowledge by the best methods, to perpetuate the pursuit of truth by training and grading those really best qualified to pursue it at different stages, and to advance knowledge through the independent contribution of its members.

The only knowledge that is worth advancing is "related knowledge", *i.e.*, knowledge of which the affiliations to, and contacts with, all other forms of knowledge are recognized and the total sum of which is purposively related to human ends, the ends of a civilized society seeking to fulfill a spiritual interpretation of life.—Sir Charles Grant Robertson.

Medical Economics

PREPAID MEDICAL SERVICES*

By Harris McPhedran, M.D.

Toronto

In several places in this Dominion members of the medical profession either by themselves or with the co-operation of laymen are organizing themselves into corporations to provide prepaid medical services. The schemes vary from place to place in organization, administration and coverage for the subscribers, amount paid to doctors, rules and regulations. Therefore it is perhaps timely to review the whole situation in order to determine if possible whether these plans should be a part of the activities of organized medicine, be it a division or a society.

ARGUMENTS FOR AND AGAINST THE ORGANIZATION AND OPERATION OF PREPAID MEDICAL SERVICES BY DOCTORS, MEDICAL SOCIETIES, OR DIVISIONS OF THE ASSOCIATION

(The supporting arguments are italicized; those in opposition are in roman)

1. That there is a demand from the public for prepaid medical service.

1. There is a very limited demand for voluntary schemes promulgated by the medical profession. Associated Medical Services has for instance about 34,000 members after being in operation several years, in spite of good salesmanship and having offices in several cities and towns with an aggregate population of some 1,500,000 people.

2. That this demand should be met by a plan controlled directly or indirectly by organized medicine and operated by it (either through a division or a society) with or without the assistance of laymen.

2. Doctors, not having been trained in the intricacies of business should confine their activities to the science of medicine and act as advisers only to any insurance company or group which may find it desirable to institute a plan of prepaid health services.

3. That by experimentation with various plans, the medical profession can thereby gain, among other things, experience in organization and administration, information as to costs of all kinds, and what services may be given.

3. In the process of gaining experience in business administration, organization, costs, etc., the members of the medical profession are in danger of losing sight of their ideals and prime objectives in practice, namely, preventing and curing illness, thereby causing disruption in their own ranks and exciting the suspicion in the minds of the public that they are more concerned with "what they can get" than "what they can give".

4. That, should such plans succeed, organized medicine would be in a better position to tell a government considering a Province-wide scheme of compulsory health insurance that organized medicine had been successful in the management of voluntary schemes and therefore could be entrusted with the management of a contributory compulsory plan.

4. There is no evidence to date that any society or division of organized medicine operating a voluntary scheme has been empowered to undertake the organization and administration of any government-sponsored, contributory scheme.

5. That prepaid voluntary schemes controlled by organized medicine in whole or in part are less costly and give better coverage to the subscriber than plans offered by regular insurance companies.

5. Regular insurance companies state definitely in a policy duly issued to the individual subscriber what illnesses are covered, what services and what monetary return the subscriber will receive for a particular illness, whereas voluntary schemes have so many exclusions, restrictions, etc., changed without due notification, that a subscriber, secure in the belief that he is protected, may in a given case, find that actually he is without protection.

6. That doctors are assured of a more satisfactory compensation for their services under the doctor-controlled schemes, especially as payment for service rendered is made to the doctor and not sent to the subscriber as may be done by insurance companies.

6. Many doctors, especially internists and consultants, do not agree that compensation for services rendered is adequate; complain that their accounts are taxed unfairly; and prefer rendering accounts directly to a patient who is free to get what he can from the corporation.

7. That all these plans under control or supervision of the profession ensure a degree of protection to the laity that is not possible under our present system of private practice, inasmuch as there are certain controls over the member-doctors of these plans by their colleagues.

7. Doctors in private practice are restrained from wrong doing and overcharging by one or all of the following ways:

i. The law of the land.
ii. The licensing bodies of the various provinces.
iii. Their patients.
iv. Their consciences.

* The substance of an address before the Quebec Division of the Canadian Medical Association, Montreal, January 27, 1945.

These corporations seeking to impose further controls—some of which may be desirable or even necessary—under the pretext of protecting the public against doctors already licensed to practise medicine, surgery and midwifery, are infringing on the rights of our licensing bodies duly established by law, and are taking the first and seemingly innocent steps towards establishing a medical bureaucracy. One corporation has a regulation which does not tend to allay concern regarding this infringement:

"The medical executive committee shall have full power and authority to determine the *fitness* and *qualifications* of *any* medical member for *any* service to be rendered *any* patient and its decisions shall be final and binding."

and

"In the event of *any* medical member performing or rendering *any* service to *any* patient contrary to the decision of the medical executive committee, such committee shall have full power and authority to disallow any compensation to such medical member for such service."

8. That whereas in the earlier stages of development of a plan, benefits may be somewhat limited and exclusions may be numerous, the former may be increased and the latter decreased as the subscriber membership grows.

8. So far as can be learned there is no tendency amongst these plans to extend benefits and curtail exclusions. In some cases the reverse is true.

9. That although experience has shown that membership in voluntary plans soon reaches a peak and then levels off, sponsors of these plans state that a somewhat similar condition applied in the early days of life insurance, which has, over the years, grown rapidly as a result of education of the public as to its great benefits.

9. This is purely wishful thinking on the part of enthusiastic sponsors of voluntary schemes.

10. That if a government extends its preventive services, helps to increase hospital beds and gives complete medical, surgical, hospital and nursing care to the present welfare group, voluntary schemes added to these services will make government-sponsored, contributory schemes unnecessary.

10. Recent developments in two Provinces do not tend to confirm this opinion.

11. That voluntary schemes offering more or less complete coverage, supplemented by a scheme providing surgical care sold in conjunction with the Blue Cross Hospital plan would enable those not in the welfare group to protect themselves against the "major hazards of illness".

11. Those opposing a plan for surgical care paralleling the Blue Cross Hospital plan and presented to the public through their agents, argue thus:

i. That Blue Cross salesmen will sell the hospitalization plan first and the plan for surgical care second, if at all.

ii. That a plan for surgical care will tend to increase unnecessary surgical procedures. Under one such plan the incidence of surgical procedures is said to be three times what it is in civil life.

iii. That if plans offering complete medical and surgical, etc., coverage have made such limited appeal to the public at large, a plan for surgical care only will be much more limited in scope. In Manitoba where the two plans are available to the public 80% so far have enrolled under the plan offering complete coverage and only 20% under the plan for surgical care.

iv. That if surgical procedures only are considered as the major hazards of illness, these can be eliminated or lessened by a sharp reduction in surgical fees.

v. That the medical profession should not be catapulted into undertaking this plan for surgical care or any other plan under duress from the Blue Cross or other organization—a threat open or veiled being "if you don't, we will". Such a proceeding has actually taken form in one Province where the profession is being offered (by the Blue Cross) a fee schedule away below the Workmen's Compensation Board's rate for care of those in the lower income bracket.

vi. That plans for surgical care only (*a*) discriminate against internists and general practitioners doing little surgery; (*b*) encourage unnecessary surgical procedures.

12. That these plans enable the thrifty to budget for their medical care and avoid the financial embarrassment of a long and costly illness or illnesses.

12. It is admitted that all thrifty people should be encouraged to budget for illness. The point in dispute is whether the medical profession should involve itself in this business or leave it to companies now engaged in insurance business.

13. That these schemes will prove beneficial in the future to the medical officers returning from overseas and faced with the problem of becoming established or re-established in practice.

13. The rate of growth to date of these voluntary prepaid schemes makes this problematical. Many argue that no new schemes should be started till our medical officers are returned to civil life.

OTHER OBJECTIONS TO CORPORATIONS OFFERING PLANS FOR PREPAID MEDICAL SERVICES

1. That having to balance their budget, corporations are not primarily concerned with improved health services, especially in the field of preventive medicine.

2. That the interposition of a third party between doctor and patient is not conducive to sound medical practice.

3. That it is contended by some that whilst prepaid medical schemes are good they should be kept separate from prepaid hospitalization schemes.

4. That subscribers' family doctors cannot attend their patients in the public wards of closed hospitals and moreover the staff doctors of these hospitals cannot charge public ward patients. In these cases what becomes of the funds provided for medical services?

* * *

Whatever may be thought of the arguments for organized prepaid medical services being managed by a division or society of organized medicine, we must not lose sight of certain things fundamental for the improvement of our present method of medical practice.

1. We must uphold at all costs our traditional ideals of service and self-sacrifice in procuring better health by the establishment of better social conditions together with the best preventive measures for the control of, and the most modern methods for the cure or alleviation of mental or physical disease.

2. We must avoid the suspicion (which has bred and still breeds hostility in the minds of the public) that the medical profession is primarily commercially minded.

3. We should, as a national body, as divisions and as societies within a division, consult with all representative groups in the Dominion, in the Provinces and in the various districts, let them know what medicine has accomplished and seek their advice and co-operation in working out a scheme or plan for improved health services.

4. We must make it plain to all that health and health services are a matter of co-operation of all organizations and political parties. They should never be made a political football: to that organized medicine should be and is I believe resolutely opposed.

5. We must make certain that any scheme or plan, national, provincial or local, is in accord with our eighteen principles as adopted at the annual meeting in Toronto 1944. If by experience any principle or principles are found unworkable, it or they should be revised or discarded.

To those promulgating schemes and plans for voluntary prepaid medical services Burns has a timely bit of advice in his ode, "To a Mouse":

"But Mousie thou are no thy lane (alone)
In proving foresight may be vain,
The best laid plans of mice and men
Gang aft agley
And lea'e us nought but grief and pain
For promised joy."

And in the same ode, to others less enthusiastic and prescient he gives this word of consolation:

"Still thou are blest compared wi' me
The present only, toucheth thee:
But och! I backward cast my e'e
On prospects drear!
An' forward tho' I canna see
I guess an' fear."

Notice of Amendment to Constitution and By-Laws

In view of the action of the Government, which during the past year, has abrogated the Department of Pensions and National Health and has replaced that Department with the Department of Veterans' Affairs and the Department of National Health and Welfare, the committee on Constitution and By-Laws recommends that the Constitution be amended as follows:

Article IX—The General Council—Section (f), which now reads, "Two representatives of the Department of Pensions and National Health who are members of the Canadian Medical Association, one of whom shall be the Deputy Minister of Pensions and National Health", be deleted, and that it be replaced by the following:—

Section (f).—"Two representatives from the Department of Veterans' Affairs who are members of the Canadian Medical Association, one of whom shall be the Director General of Treatment Services; also two representatives from the Department of National Health and Welfare, who are members of the Canadian Medical Association, one of whom shall be the Deputy Minister in charge of Health."

We should keep in mind the fact that the mortality rate from tuberculosis is highest in the older age groups. The highest rate for men is after age fifty; for women the rate is almost as high in the sixties as it is in the twenties, and highest of all in the seventies.—The Modern Attack on Tuberculosis, Henry D. Chadwick.

Association Notes

PRELIMINARY PROGRAM
SEVENTY-SIXTH ANNUAL MEETING
OF THE
Canadian Medical Association
TO BE HELD IN THE MOUNT ROYAL HOTEL, MONTREAL,
JUNE 11, 12, 13, 14, 15, 1945

President - - - - DR. HARRIS MCPHEDRAN, Toronto

President-Elect - - - DR. LÉON GÉRIN-LAJOIE, Montreal

General Secretary - - DR. T. C. ROUTLEY, Toronto

DETAILED arrangements for the Seventy-sixth Annual Meeting to be held in Montreal during the week of June 11 are proceeding satisfactorily.

General Council will meet on Monday and Tuesday, June 11 and 12.

On Tuesday evening, General Council will be dinner guests of the Quebec Division.

A series of Round Table Conferences has been arranged for the mornings of Wednesday, Thursday and Friday, from nine to ten o'clock, to be followed by General Sessions.

Sectional Meetings will be held on Wednesday and Thursday afternoons.

The Annual General Meeting will be held on Wednesday evening, June 13, commencing at 8.30 o'clock. On this occasion the retiring President, Dr. Harris McPhedran, of Toronto, will hand over the badge of office to his successor, Dr. Léon Gérin-Lajoie, of Montreal. The meeting will be followed by music and dancing.

Thursday evening has been given over to a discussion of health insurance and allied problems.

CANADIAN ORTHOPÆDIC ASSOCIATION

The Canadian Orthopædic Association will meet in Salon B, Mount Royal Hotel, on Monday and Tuesday, June 11 and 12.

CANADIAN ASSOCIATION OF RADIOLOGISTS

The Canadian Association of Radiologists will meet in Salon I on Tuesday, June 12, with a meeting of Council in the morning followed by a general business session in the afternoon. The annual banquet will be held on Thursday evening, June 14.

CANADIAN SOCIETY FOR THE STUDY OF DISEASES OF CHILDREN

The Canadian Society for the Study of Diseases of Children will hold a business meeting in Salon F on Wednesday, June 13, at 4.30 p.m.

FEDERATION OF MEDICAL WOMEN OF CANADA

The Annual Meeting of the Federation of Medical Women of Canada will take the form of a dinner at the Montreal University Women's Club on Thursday, June 14, at 7.00 p.m.

Transportation from the Mount Royal Hotel will be provided.

CANADIAN MEDICAL PROTECTIVE ASSOCIATION

The Canadian Medical Protective Association will hold its annual meeting immediately following the scientific program at 4.30 p.m. on Thursday, June 14, in Salon C.

CANADIAN SOCIETY FOR THE CONTROL OF CANCER

The Grand Council of the Canadian Society for the Control of Cancer will meet in the Convention Room on Friday afternoon, June 15, at two o'clock.

ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF CANADA

The Council of the Royal College of Physicians and Surgeons of Canada will meet in Salon B on Friday evening, June 15, continuing on Saturday morning if necessary.

The Committee on Certification of Specialists will meet in the same place on Friday afternoon, June 15, at two o'clock.

SCIENTIFIC PROGRAM

Wednesday, June 13

ROUND TABLE CONFERENCES

9.00 – 10.00 a.m.

Dermatology

Chairman: **Dr. J. F. Burgess, Montreal.**
Subject: *Urticaria.*

Medicine

Chairman: **Dr. G. R. Brow, Montreal.**
Subject: *The Problem of the Hypertensive Patient.*

Obstetrics and Gynæcology

Chairman: **Dr. Hector Sanche, Montreal.**
Subject: *Pregnancy Complicating Tuberculosis.*

Ophthalmology

Chairman: **Dr. F. T. Tooke, Montreal.**
Subject: *Penicillin in Ophthalmology.*

Pædiatrics

Chairman: **Dr. J. Boyd Scriver, Montreal.**
Subject: *Implications of Non-diphtheritic Croup in Childhood.*

Radiology

Chairman: **Dr. W. V. Cone, Montreal.**
Subject: *Protrusion of the Intervertebral Disc.*

Surgery

Chairman: **Dr. A. L. Wilkie, Montreal.**
Subject: *Biliary Tract Diseases.*

Urology

Chairman: **Dr. Oscar Mercier, Montreal.**
Subject: *Radical Treatment of Bladder Tumours.*

GENERAL SESSION

Wednesday, June 13

10.15 a.m.

Dr. A. H. Gordon, Montreal.
Medicine in Montreal in the 90's.

Dr. A. D. Ruedemann, Cleveland, Ohio.
Differential Diagnosis of Proptosis (lantern slides).

Dr. Harris McPhedran, Toronto.
Valedictory Address.

The Lister Lecture.

Dr. O. H. Wangensteen, Minneapolis, Minn.
Some Aspects of the Ulcer Problem.

SECTIONAL MEETINGS

2.15 p.m.

Wednesday, June 13

Section of Anæsthesia

Dr. S. M. Friedman, Montreal.
Brachial Plexus Block.

Dr. Maurice Fortier, Montreal.
Therapeutic Use of Local Anæsthetic Agents.

Dr. Fernando Hudon, Quebec.
Pentothal Sodium Anæsthesia for Thyroidectomy.

Section of Historical Medicine

Wednesday, June 13

Dr. Gabriel Nadeau, Rutland State Sanatorium, Rutland, Mass.
Obstetrics and Gynæcology in New France.

Dr. E. P. Scarlett, Calgary.
Five Against Oblivion.

Dr. Harold N. Segall, Montreal.
The First Clinic-Pathological Case Report of Angina Pectoris Associated with Aortic Valve Stenosis, in a letter from Dr. Wall to Dr. Heberden, May 30, 1772.

Dr. Philippe Panneton, Montreal.
Notes Médicales sur les Indigènes d'Amérique dans les écrits d'Améric Vespus.

Section of Medicine

Wednesday, June 13

Dr. Paul Dumas, Montreal.
Goitre and Thiouracil.

Dr. J. W. McKenzie, Charlottetown.
Pancreatic Cyst with Report of a Case.

Dr. Leopold Morissette, Montreal.
The Diagnostic Value of Blood Smears.

Dr. E. H. Mason, Montreal.
Treatment of Circulatory Diseases of the Extremities.

Section of Obstetrics and Gynæcology

Wednesday, June 13

Dr. Jacques Fortier, Montreal.
Caudal Anæsthesia.

Dr. F. G. McGuinness, Winnipeg.
Forceps Delivery—Indications and Dangers.

Dr. E. M. Robertson, Kingston.
Maternal and Fetal Anoxia with a Consideration of the Possible Remote Effects of Asphyxia Neonatorum.

Dr. W. P. Tew, London.
Avoidable Complications in Obstetrics and Gynæcology.

Section of Ophthalmology

Wednesday, June 13

Wing Commander Kenneth Evelyn, Montreal.
Night Vision.

Dr. Jean Lacerte, Quebec.
Un Cas de Buphtalmie (glaucome infantil) traité par le Sulpharsenamine.

Dr. A. D. Ruedemann, Cleveland, Ohio.
The Use of Beta Radium in Lesions of the Eye.

Dr. Alexander E. MacDonald, Toronto.
New Treatment of Entropion (lantern slides).

Section of Pædiatrics

Wednesday, June 13

Dr. G. B. Wiswell, Halifax.
The Anæmias of the New Born.

Dr. C. E. Snelling, Toronto.
Jaundice in Infancy.

Dr. Jean Paul Beaudet, Three Rivers.
Treatment of Whooping Cough with Serum.

Dr. Albert Guilbeault, Montreal.
La Vaccination Anti-Tuberculeuse par le BCG.

Section of Radiology

Wednesday, June 13

Dr. G. Pinsonneault, Montreal.
Roentgentherapie au Contact dans les lesions malignes de la bouche.

Dr. C. L. Ash, Toronto.
X-Ray Treatment of Arthritis.

Dr. E. H. Shannon, Toronto.
Observations on the Roentgen Therapy of Embryonal Carcinoma of the Testis.

Surg.-Lieut. Commander J. Bouchard, Halifax.
Oxygen Arthrography of the Knee Joint.

Section of Surgery

Wednesday, June 13

Dr. Edouard Desjardins, Montreal.
Drainage Abdominal.

Dr. O. H. Wangensteen, Minneapolis, Minn.
The Management of Bowel Obstruction.

Lieut.-Col. S. D. Gordon, Toronto.
The Late Repair of Burn Deformities (moving pictures).

Dr. Francois Archambault, Montreal.
Ileitis Terminale.

Section of Urology

Wednesday, June 13

Dr. Walter Hogarth, Fort William.
The Suppression of Urine due to Giant Hydronephrosis.

Dr. Jean Paul Bourque, Montreal.
History of French Urology.

Surg.-Lieut. Commander John T. MacLean, Ste. Anne de Bellevue, Que.
Repair of War Wounds to the Bulbous and Membranous Urethra with the Use of Skin Grafts and Penicillin.

Surg.-Lieut. W. E. Collins, St. John's, Nfld.
Prostatitis on the North Atlantic Service.

Dr. Lucien Sylvestre, Montreal.
Penicillin in the Treatment of Gonorrhœa.

Thursday, June 14

ROUND TABLE CONFERENCES

9.00 – 10.00 a.m.

Anæsthesia

Chairman: **Dr. H. Griffith, Montreal.**

Subject: *Interesting Cases.*

Dermatology

Chairman: **Dr. Paul Poirier, Montreal.**

Subject: *Evaluation of Penicillin and other Intensive Methods of Therapy in Syphilis.*

Medicine and Surgery Combined

Chairman: **Dr. C. G. Sutherland, Montreal.**

Subject: *Gastric and Duodenal Ulcer.*

Obstetrics and Gynæcology

Chairman: **Dr. Oscar Mercier, Montreal.**

Subject: *Urinary Tract Infections in Pregnancy.*

Otolaryngology

Chairman: **Dr. G. E. Tremble, Montreal.**

Subject: *Non-surgical Treatment of Sinus Infection.*

Pædiatrics

Chairman: **Dr. A. Goldbloom, Montreal.**
Dr. Paul Letondal.
Dr. J. M. O'Neill.
Dr. F. Shippam.

Subject: *Chronic diarrhœa in Young Children.*

GENERAL SESSION

Thursday, June 14

10.15 a.m.

Dr. John Fraser, Montreal.
The Management of Chronic Pelvic Infection.

Dr. Charles E. Grignon, Montreal.
Treatment of Menopause.

French Guest Speaker.

The Honourable Dr. R. P. Vivian, Minister of Health for Ontario.
The Rôle of Public Health in the Practice of Medicine.

SECTIONAL MEETINGS

2.15 p.m.

Thursday, June 14

Section of Anæsthesia

Dr. R. J. Fraser, Hamilton.
Continuous Spinal Anæsthesia.

Dr. Marian Webster, Toronto.
Intravenous Procaine for Postoperative Pain Relief.

Dr. Gladys Nitikman, Montreal.
Spinal Anæsthesia for Operations on the Vertebral Column.

Section of Dermatology

Thursday, June 14

Dr. J. Adrien Lambert, Montreal.
Vitamins in Dermatology.

Dr. George B. Sexton, London, Ont.
The Use of Aldersone in the Treatment of Neurosyphilis.

Surg.-Lieut. Cmdr. Donald S. Mitchell, Halifax.
Experiences of Penicillin in Dermatitis in the Forces.

Dr. George S. Williamson, Ottawa.
Severe Erythema Multiforme: A discussion of its Etiological Relation to Primary Atypical Pneumonia and a Report of Six Cases.

Section of Industrial Medicine
Thursday, June 14

Dr. Alberic Marin, Montreal.
Industrial Dermatoses.

Dr. F. J. Tourangeau, Quebec.
Une Revue des Risques industriels auxquels la santé des ouvriers est exposée dans la province de Québec.

Dr. Lucien Brouha, Montreal.
Fatigue.

Dr. J. G. B. Lynch, Sydney, N.S.
Medical Care in the Coal Mining and Steel Industries of Nova Scotia.

Dr. D. Ewen Cameron, Montreal.
Psychiatry in Industry.

Section of Medicine
Thursday, June 14

Dr. Joseph Kauffman, Montreal.
The Clinical Use of Anti-coagulants.

Dr. F. A. Willius, Rochester, Minn.
The Critical Evaluation of Methods of Diagnosis in Cardiac Disease with Special Reference to Electrocardiography.

Dr. W. R. Campbell, Toronto.
Cardiovascular Disease in Diabetes Mellitus.

Colonel A. B. Walter, Ottawa.
Atypical Pneumonia.

Section of Obstetrics and Gynæcology
Thursday, June 14

Dr. John Mann, Toronto.
Important Clinical Aspects in the Treatment of Chorionepithelioma. A series of cases is reported.

Dr. A. E. Trites, Vancouver.
Care of the Gravid Patient.

Dr. Kenneth M. Grant, Halifax.
Puerperal Sepsis (lantern slides).

Dr. Jacques Gauthier, Montreal.
Quelques Considérations sur les Grossesses Ectopiques.

Section of Ophthalmology
Thursday, June 14

Dr. K. B. Johnston, Montreal.
Metastatic Carcinoma of Uvea.

Dr. Jules Brault, Montreal.
Treatment of Glaucoma Secondary to Uveitis.

Dr. Lloyd Morgan, Toronto.
Resection of the Ocular Muscles.

Dr. Henri Pichette, Quebec.
Cranio-Facial Deformities in relation to Muscular Desequilibrium: Heterophoria and Strabismus (motion pictures).

Section of Otolaryngology
Thursday, June 14

Dr. A. O. Freedman, Montreal.
Dr. J. W. McKay, Montreal.
Diseases of the Laryngeal Ventricle and the Tomograph X-Ray.

Dr. Hector Mortimer, Montreal.
The Testing of Hearing of Speech.

Dr. Valmore Latraverse, Montreal.
Bedside Bronchoscopy—a New Position (with moving pictures).

Lieut.-Col. Donald S. McEachern, Ottawa.
Rehabilitation of War Personnel Subjected to Aural Trauma.

W./C. Joseph A. Sullivan, Toronto.
Indications for and End Results of the Fenestration Operation.

Section of Pædiatrics
Thursday, June 14

Dr. F. W. Jeffrey, Ottawa.
Intestinal Obstruction in the Newborn.

Dr. J. A. Toomey, Cleveland.
Lesions about the Eyes in Acute Infectious Diseases.

Dr. H. S. Little, London.
Urological Investigation in Children with Abdominal Pain.

Dr. Alton Goldbloom, Montreal.
Dr. Helen Friedman, Montreal.
Galactæmia.

Section of Radiology
Thursday, June 14

Dr. Albert Jutras, Montreal.
Dr. Francois Badeaux, Montreal.
Roentgentherapy of Inflammatory Lesions of the Eye.

Dr. L. A. Gagnier, Montreal.
Aspect Radiologique d'un Reticulo-Sarcome primitif d'un rein.

Dr. Mathieu Samson, Quebec.
Subject of choice.

Dr. J. W. McKay, Montreal.
Dr. J. E. Pritchard, Montreal.
Diseases of Bone.

Section of Surgery
Thursday, June 14

Dr. Georges Cartier, Montreal.
Peripheral Vascular Disease.

Lieut.-Col. G. A. Holland, Debert.
Varicose Veins.

Lieut.-Col. S. Jameson Martin, Montreal.
Carcinoma of the Mouth.

Dr. E. M. Cooper, Montreal.
Arterio-venous Fistula.

Section of Urology
Thursday, June 14

Dr. C. A. Cawker, Montreal.
Treatment of Cystine Calculi.

Dr. Norman W. Roome, Toronto.
Treatment with Vitamin B of a Special Type of Vesical Atony.

Dr. H. D. Morse, Winnipeg.
Dr. C. B. Stewart, Winnipeg.
The Surgical Treatment of Stones in the Lower Calyx of the Kidney.

Dr. S. A. MacDonald, Montreal.
Mortality in Prostatic Adenoma.

Friday, June 15
ROUND TABLE CONFERENCES

9.00 – 10.00 a.m.

Anæsthesia

Chairman: **Dr. Wesley Bourne, Montreal.**
Subject: *Interesting Cases.*

Medicine

Chairman: **Dr. Keith Gordon, Montreal.**
Subject: *The Treatment of Pneumonia.*

Radiology

Chairman: **Dr. W. L. Ritchie, Montreal.**
Subject: *Roentgentherapy of Inflammatory Conditions.*

Surgery

Chairman: **Dr. Dudley E. Ross, Montreal.**
Subject: *Thoracic Surgery.*

Urology

Chairman: **Dr. Paul Bourgeois, Montreal.**
Subject: *Surgical Treatment of Uretero-pelvic Obstruction.*

GENERAL SESSION

Friday, June 15

10.15 a.m.

Dr. Fred Smith, Montreal.
Penicillin in Surgery.

Dr. Charles Lefrancois, Montreal.
The Surgical Management of Diverticulitis of the Colon.

Dr. John A. Toomey, Cleveland.
The Treatment of Poliomyelitis in the Acute Stage.

Dr. F. A. Willius, Rochester, Minn.
Cor Pulmonale.

CANADIAN ORTHOPÆDIC ASSOCIATION

First Annual Meeting, June 11 and 12, 1945, Salon "B" Mount Royal Hotel, Montreal

(Courtesy of the Canadian Medical Association)

First day, Monday, June 11

Business Meeting.
Dr. J. E. Samson, Montreal, Chairman.

(1) 10.00 a.m.—Members welcomed by
Dr. J. A. Nutter, Montreal.

(2) General Secretary's report.
Dr. J. C. Favreau, Montreal.

(3) Presentation of Constitution and By-Laws.
Dr. J. E. Samson.
Discussion will open.

(4) Elections.

(5) Notice of Motion.....

12.30 Lunch will be served in Salon "B".
Guest speaker, Mr. J. A. Duckett, Montreal.
The Stump and the Prosthetist.

Annual Dinner.

Salon "B", Dinner jacket, cocktails at 7.30.

Tuesday, June 12 — Salon "B"

Scientific Program

Dr. J. A. Nutter, Chairman

9.00 – 9.30

Col. R. I. Harris and staff of the Orthopædic Treatment Centre at Christie Street Hospital, Toronto.

(1) **Col. R. I. Harris.**
Nephrolithiasis due to Prolonged Recumbency.

(2) **S./L. Coleman.**
The Use of Cancellous Bone Grafts in the Treatment of Bone Defects of the Extremities.

(3) **Major J. Bateman.**
The Technique of Plasma Suture of Peripheral Nerve Injuries.

(4) **Dr. G. M. Dale.**
The Evaluation of End-bearing Amputations.

10.30 – 11.00

Dr. Gerald L. Burke, Vancouver.
The Dennis-Browne Method of Treatment of Club-feet.

11.00 – 12.00

Dr. J. E. Samson and staff.
Symposium on Back Pain.

(1) **Dr. U. Frenette.**
Congenital Anomalies.

(2) **Dr. R. Gariepy.**
Trauma.

(3) **Dr. Paul Potvin.**
Soft Tissue Lesions.

(4) **Dr. J. E. Samson.**
Arthritis and Rupture of Disc.

12.00 – 12.30

Dr. S. E. Goldman.
Fusion of the Adult Hip for Tuberculosis.

Col. R. I. Harris, Chairman

2.00 – 2.30

Dr. Andrew MacKinnon, Winnipeg.
The Subastragaloid Joint—a plea for its recognition clinically.

2.30 – 3.00

Dr. W. G. Turner.
Subject to be announced.

3.00 – 3.30

Dr. Antonio Samson, Montreal.
Periarthritis of the Shoulder Joint with coloured moving pictures.

3.30 – 4.00

Dr. Joseph M. Murray, Ottawa.
Arthroplasties and Reconstructive Joint Surgery with moving pictures.

4.00 – 4.30

Dr. Norman T. Williamson, Montreal.
Epiphysitis of Adolescence.

Canadian Medical War Services

MEDICAL OFFICERS APPOINTED TO THE R.C.A.M.C. — ACTIVE FORCE

MARCH, 1945

(Previous sections appeared in the issues of February, March, May, July, September, November and December 1943, in each issue for 1944 except April and September, and in January, March and April, 1945.)

SECTION XXXV

Name Address	Date of Appointment
Abell, M. R., Alymer, Ont.	19-2-45
Acton, W. C., Edmonton	7-2-45
Alcock, A. J. W., Winnipeg	23-2-45
Alter, C., Toronto	19-2-45
Amunsden, L. R., Claresholm, Alta.	7-2-45
Anthony, L., Toronto	19-2-45
Arnup, W. B., Toronto	19-2-45
Bain, H. W., North Bay, Ont.	19-2-45
Barends, H. A., Ottawa	20-2-45
Barnett, H. J. M., Toronto	19-2-45
Bashucky, W., Winnipeg	15-2-45
Bean, A. H., Regina, Sask.	27-1-45
Beattie, W. G., Ottawa	19-2-45
Bell, D. M., Edmonton	17-2-45
Bell, R. H., Staynor, Ont.	19-2-45
Berris, B., Toronto	19-2-45
Best, E. W. R., Toronto	19-2-45
Blackwell, G. L., Bradford, Ont.	19-2-45
Blais, J. A., Montreal	7-3-45
Bolocan, H., Vancouver	19-2-45
Borland, K. R., Toronto	19-2-45
Brason, F. W., Vancouver	19-2-45
Brown, L. B., Edmonton	23-2-45
Bryans, A. M., Toronto	19-2-45
Butcher, J. J., Hamilton, Ont.	19-2-45
Cameron, C. G., Toronto	19-2-45
Cameron, W. K., Toronto	19-2-45
Campbell, D. B., Toronto	19-2-45
Campbell, D. E. M., Toronto	15-3-45
Cholod, S., Hafford, Sask.	10-2-45
Christie, J. V., South Porcupine, Ont.	19-2-45
Clarke, W. T. W., Toronto	19-2-45
Cole, J. E. C., Toronto	19-2-45
Cottrell, J. D., Calgary, Alta.	7-2-45
Crawford, J. S., Toronto	19-2-45
Davies, L. S., Toronto	19-2-45
Delaney, R. J., Barrie, Ont.	19-2-45
Dickson, R. K., Sarnia, Ont.	20-2-45
Dorval, C. H., Quebec	4-1-45
Dowd, G. C., Toronto	19-2-45
Drake, C. G., Windsor, Ont.	19-2-45
Dunn, D. H., Cookstown, Ont.	19-2-45
Edmonds, L. M., Lacombe, Alta.	7-2-45
Elliott, R. C., Hamilton, Ont.	19-2-45
Elshout, C. H., Toronto	19-2-45
Farquharson, R. A., Meaford, Ont.	19-2-45
Fearon, B. W., Mulgrave, N.S.	19-2-45
Fisher, W. F., Hamilton, Ont.	19-2-45
Fjordbotten, A. L., Granum, Alta.	7-2-45
Frain, J. B., Toronto	19-2-45
Fulton, J. B., Edmonton	7-2-45
Gallie, H. R., Toronto	19-2-45
Galloway, G. D., Alameda, Sask.	16-2-45
Gastle, H. E., Milton, Ont.	19-2-45
Goldstein, A. V., Toronto	19-2-45
Gorvoy, J. D., Toronto	20-2-45
Gouch, J. C., Regina, Sask.	20-2-45
Graham, G. G. K., Saskatoon, Sask.	7-2-45
Gray, O. V., Edmonton	19-2-45
Hall, R. L., Wadina, Sask.	19-2-45
Hazell, H. C., Whitby, Ont.	19-2-45
Hebert, J. G., Montreal	22-2-45
Hemstock, J. W., Fairview, Alta.	7-2-45
Horsey, W. J., Toronto	19-2-45
Hunt, D. W., Winnipeg	15-2-45
Jaffey, B. D., Toronto	19-2-45
Johannesson, T., Winnipeg	19-2-45
Jones, H., Kingston, Ont.	20-2-45
Johnston, D. C., Victoria, B.C.	19-2-45
Johnston, K. M., Toronto	19-2-45
Johnston, L. W., Calgary, Alta.	7-2-45
Keeler, W. R., Toronto	19-2-45
Kreiner, H. O., Kitchener, Ont.	19-2-45
Kyle, J. L., Montreal	19-2-45
Lamont, W. H., Winnipeg	16-2-45
Lapierre, A. P., Toronto	19-2-45
Loeb, H. H., Ottawa	20-2-45
Love, W. R., Hamilton, Ont.	19-2-45
Lovering, J. H. D., Trafalgar, Ont.	19-2-45
Loynes, J. S., Toronto	19-2-45
MacBeth, R. A. L., Edmonton	7-2-45
McCormick, R. W., Harrow, Ont.	31-1-45
McEwen, D. C., Regina, Sask.	27-1-45
McKeage, J. F., Nanton, Alta.	7-2-45
McKenna, F. E., Toronto	19-2-45
McNeill, J. I., Toronto	19-2-45
McPhail, D. M., Manitou, Man.	15-2-45
McQuay, J. B., Kingston, Ont.	20-2-45
McQuay, N. W., Kingston, Ont.	20-2-45
Medd, D., Winnipeg	19-2-45
Mendelson, J., Toronto	19-2-45
Montgomery, D. C., Ottawa	20-2-45
Moreau, J. P.	7-2-45
Munkley, F. H., Toronto	19-2-45
Murphy, A. P., Moncton, N.B.	21-2-45
Nadeau, N., Baker Brook, N.B.	6-12-44
Nancikivell, H. K., Hamilton, Ont.	19-2-45
Nichol, D. A., Saskatoon, Sask.	19-2-45
O'Hara, P. J. A., Toronto	19-2-45
Parrott, F. C., Midland, Ont.	19-2-45
Pearsall, H. E., Toronto	19-2-45
Phillips, D. L. G., Calgary, Alta.	7-2-45
Porter, J. M., Toronto	19-2-45
Postnikoff, J. I., Blaine Lake, Sask.	19-2-45
Povah, A. H., Kelowna, B.C.	15-2-45
Reed, R. H. B., Vancouver	17-3-45
Roberts, L. N., Toronto	19-2-45
Robertson, R. W., Toronto	19-2-45
Robertson, W. J., Liberty, Sask.	19-2-45
Rogers, K. E., London, Ont.	19-2-45
Rook, F. W., Toronto	19-2-45
St. John, J. R., Uxbridge, Ont.	19-2-45
Schwartz, B., Ashern, Man.	16-2-45
Siegel, E. J., Hamilton, Ont.	19-2-45
Simpson, J. S., Toronto	19-2-45
Sinclair, A. B., Sault Ste. Marie, Ont.	19-2-45
Sinclair, J. A., Edmonton	7-2-45
Small, A. A., Toronto	19-2-45
Smith, G. W., Toronto	19-2-45
Smyth, M. P., Toronto	19-2-45
Snider, G. L., Toronto	19-2-45
Spaulding, W. B., Toronto	19-2-45
Spence, J. B., Fort William, Ont.	19-2-45
Solomon, C. J., Blind River, Ont.	19-2-45
Steele, H. D., Arnprior, Ont.	20-2-45
Stephens, J. W., Hanna, Alta.	7-2-45
Stevenson, H. C., Belmont, Man.	20-2-45
Stillman, A. T., Toronto	19-2-45
Taylor, J. R., Regina, Sask.	27-1-45
Thomas, E. J., Winnipeg	23-2-45
Turner, K. P., Moose Jaw, Sask.	24-2-45
Wallace, J. B., Wainwright, Alta.	7-2-45
Wallis, H. M., Toronto	19-2-45
Walsh, F. M., Regina, Sask.	27-1-45
Watters, N. A., Toronto	19-2-45
Weinberg, F., Toronto	19-2-45
Wiggin, N. J. B., Kingston, Ont.	20-2-45
Wilson, D. L., Hamilton, Ont.	19-2-45
Wolfe, A. D., Winnipeg	17-1-45
Wright, R. N., Weston, Ont.	19-2-45
Zeman, H. B., Kenaston, Sask.	19-2-45

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE

MARCH, 1945

SECTION XXXVI

Name	*Address*	*Date struck off strength*
Cain, M. C.,	Toronto	15-3-45
Bennett, S. R.,	Toronto	2-3-45
Bird, E. S.,	Gananoque, Ont.	12-3-45
Blakely, H. W.,	Kingston, Ont.	Died
Boucher, J. H. R.,	Montreal	2-3-45
Brooks, G.,	Winnipeg	9-1-45
Clegg, G. G.,	Picton, Ont.	18-2-45
Fraser, W. R.,	Arcola, Sask.	17-3-45
Griffin, B. M.,	Waterford, Ont.	31-1-45
Kenny, R. Y.,	Toronto, Ont.	7-3-45
McKim, L. H.,	Montreal	22-3-45
Maloney, G. C.,	Toronto	16-3-45
Overhalt, A. A.,	Brantford, Ont.	20-2-45
Ployart, C. H.,	Lillooet, B.C.	1-3-45
Poisson, P.,	Tecumseh, Ont.	13-2-45
Pollack, S. L.,	Quebec	13-3-45
Ratner, M.,	Outremont, Que.	14-2-45
Spencer, E. W.,	Saskatoon, Sask.	22-2-45
Williams, D. H.,	Vancouver, B.C.	7-2-45

Medical Societies

La société médicale des hôpitaux universitaires de Québec

Une séance de cette société eut lieu à l'Hôtel-Dieu de Québec, le 2 mars 1945. Suivant les résumés des travaux présentés.

CONSIDÉRATIONS SUR LA MIGRATION DES CORPS ÉTRANGERS DANS LES VOIES DIGESTIVES INFÉRIEURES.—P. Painchaud.

Edmond Aucoin, dans sa monographie "L'Endoscopie Perorale", publiée en France, a écrit: "le respect de l'intégrité du corps confié à nos soins doit demeurer la règle essentielle de notre art" et, plus loin, il ajoutait: "Il ne faut pas que l'ignorance autorise des mutilations inutiles".

A ce propos, l'auteur indique la conduite à tenir lors de la présence d'un corps étranger effilé, irrégulier, dans l'estomac. Il met en garde contre une intervention trop hâtive.

L'auteur recommande l'ingestion répétée d'huile d'olive ou minérale et d'asperges, cette partie dédaignée des gourmets, et vulgairement appelée "queue". Riches en fibrilles, ces "queues d'asperge" se dissocient dans l'estomac et s'enroulent autour du corps étranger, dont elles facilitent la migration vers le duodénum après en avoir favorablement modifié la position.

Sept observations personnelles sont rapportées, à savoir: 3 cas d'épingle de sûreté ouverte de 80° à 135°; un bouchon métallique de bouteille de bière; une épingle droite; une pince à cheveux; une prothèse dentaire (3 dents). La présence d'une des épingles de sûreté ouverte dans l'estomac datait de 10 jours malgré une alimentation riche en pain, patates, pois, céleri, fèves, voire même du coton hydrophile; 18 heures après l'ingestion de queues d'asperge, l'épingle était éliminée par voie anale. La surveillance radiologique est primordiale, celle-ci indiquant la situation de l'objet et le niveau de son arrêt si la migration est arrêtée.

MIGRATION DES CORPS ÉTRANGERS A TRAVERS LES VOIES DIGESTIVES INFÉRIEURES.—R. Lessard.

L'auteur insiste sur l'importance de la collaboration médico-radiologique dans la recherche et la localisation des corps étrangers qui ont pénétré dans l'estomac et les voies digestives inférieures.

Au moyen de la radioscopie et de la radiographie, le radiologiste pourra localiser le corps étranger et en suivre la migration à travers le tube digestif. Sur ses conseils, le médecin attendra l'évacuation spontanée ou il interviendra chirurgicalement.

L'antre et la région prépylorique, la deuxième portion duodénale, l'angle duodéno-jéjunal, l'iléon terminal et le cæcum sont les endroits de prédilection où les corps étrangers ralentissent ou s'arrêtent.

La plupart des corps étrangers s'éliminent spontanément mais leur séjour trop long dans une même portion du tube digestif est une indication pour l'acte chirurgical, laquelle indication sera fournie par le radiologiste.

A PROPOS DE DEUX CAS DE PARALYSIE BULBAIRE.—J.-B. Jobin et B. Paquet.

Les auteurs rapportent deux observations de "paralysie bulbaire".

La première est celle d'une femme de 60 ans qui, brusquement fut prise d'une paralysie de la déglutition sans manifestation hémiplégique. Un mois après les débuts de la maladie, la malade peut déglutir les liquides, les semi-liquides, mais non pas les solides. La moitié gauche du voile du palais est paralysée et la malade a, dans son avant-bras droit, des troubles sensitifs importants.

La deuxième observation est celle d'un homme qui a fait un paralysie vélo-palatine gauche avec paralysie de la corde vocale gauche, troubles sensitifs dans la région fronto-pariétale gauche, un syndrôme de Claude-Bernard-Horner gauche et incoordination des mouvements dans les membres gauches également, et enfin, une paralysie vésicale depuis le début de la maladie.

Après avoir rapporté ces observations, on tente une interprétation pathogénique, en rattachant les troubles aux centres nerveux correspondants. Il arrive que dans les deux cas ces centres sont localisés dans la portion latérale du bulbe avec intégrité des faisceaux pyramidaux et intégrité également des noyaux de la protubérance.

Ils terminent en mentionnant la possibilité de traiter les affections vasculaires cérébrales par des blocages à la novocaine du ganglion stellaire.

DOULEURS LOMBAIRES ET ÉQUILIBRE DU BASSIN.—L.-P. Roy.

La lombalgie pose toujours un problème embarrassant pour le médecin à cause de la multiplicité de ses causes et de la difficulté du traitement. Toujours avoir présent à la mémoire que le déséquilibre du bassin, soit frontal, soit sagittal, est une cause fréquente de douleur lombaire. Le déséquilibre frontal peut provenir du pied, du genou, de la hanche, à la suite d'affections congénitales ou acquises du système osseux ou musculaire. Le déséquilibre sagittal reconnait comme causes des altérations musculaires ainsi que des lésions osseuses, soit de la hanche ou de la colonne vertébrale.

Qu'il s'agisse de bascule latérale ou antéro-postérieure du bassin, la thérapeutique est bien armée; qu'elle

soit orthopédique, chirurgicale ou gymnastique. Parfois ce déséquilibre s'est constitué à titre de compensation; il faut alors le respecter.

CHOLÉCYSTITE ET CHOLÉLITHIASE CHEZ LES JEUNES ASPECTS ETIOLOGIQUES.—J. Turcot.

Les cholécystites sont habituellement d'origine infectieuse, mais peuvent être dues à un reflux du suc pancréatique dans les voies biliaires. Cette possibilité a été étudiée expérimentalement par divers auteurs.

L'inflammation vésiculaire est généralement reconnue comme un des facteurs étiologiques principaux de la lithiase. L'alimentation, en modifiant le métabolisme du cholestérol joue aussi un rôle. Cependant, la grossesse, à qui on accordait une grande importance, ne semble plus avoir une influence décisive dans l'étiologie de la cholélithiase.

La prédominance de cette affection chez la femme doit plutôt être attribuée au métabolisme du cholestérol, soumis à l'action des hormones ovariennes. C'est ainsi qu'on explique l'exclusivité de la lithiase chez la femme, constatée dans une série de malades de moins de 30 ans, opérées pendant les années 1939-40-41-42, à l'Hôtel-Dieu de Québec.

Une séance de cette société eut lieu à la Crèche St. Vincent de Paul, le 16 mars 1945. Ainsi que les résumés des trauvaux qui y furent présentés.

LES ŒSTROGÈNES DANS L'INHIBITION DE LA MONTÉE LAITEUSE.—Y. Paradis.

Déjà, on avait pu démontrer l'action certaine de la folliculine dans l'inhibition de la montée laiteuse, quand le diéthystilbestrol fit son apparition dans le monde médical. De très nombreux cas cliniques ont été rapportés jusqu'ici. Des expériences plutôt humbles du début à celles plus importantes de la fin, tous les auteurs rendent compte de la haute valeur de cet œstrogène synthétique dans la suppression de la lactation comme dans l'abolition des symptômes mammaires qui l'accompagnent.

De notre côté, nous avons pu observer, à l'Hôpital de la Miséricorde, 90 cas de montée laiteuse indésirables traités au diéthystilbestrol. A l'exclusion de deux échecs complets, aucune accouchée n'a présenté de gonflement douloureux des seins tandis que la suppression de la secrétion mammaire elle-même était obtenue dans 95.5% des cas.

En face d'un tel résultat, notre faveur se dirige d'emblée vers l'emploi du diéthystilbestrol dans le traitement des montées laiteuses indésirables. Son action nous semble supérieure à celle de n'importe quel autre produit employé jusqu'ici au même usage, y compris la folliculine et la testostérone.

CONSIDÉRATIONS SUR LA LUXATION CONGÉNITALE DE LA HANCHE CHEZ L'ENFANT.—L.-P. Roy.

Affection assez rare dans notre pays et que l'on rencontre généralement alors que l'enfant commence à marcher. Les malformations osseuses sont toujours les mêmes: sourcil cotyloidien tendant à la verticalité, tête fémorale très peu développée.

Le traitement doit être précoce afin que l'acetabulum se développe et que la tête fémorale grossisse. Onze cas seulement ont été traités à l'Hôtel-Dieu de Québec de juin 1935 à janvier 1945. Dix cas étaient des luxations unilatérales chez des filles âgées de 20 mois à 10 ans. Dans quatre cas, la réduction a pu être faite sans traction préalable dans les autres cas, l'extension continue suivie d'une butée a été nécessaire.

HÉPATITE CHRONIQUE ET CIRRHOSE BILIAIRE DE L'ENFANT.—D. Lapointe et E. Dechêne.

Nous avons observé, dans notre service, un nourrisson qui nous a vivement intéressé à cause de la durée d'un ictère. Pendant deux mois et demi, cet ictère a persisté avec en plus quelques vomissements, une température moyenne et une hypertrophie de la rate et du foie. Nous nous sommes surtout arrêté à la possibilité d'un ictère catarrhal. La longue évolution et l'hypertrophie de la rate nous a fait croire que l'infection avait dû favoriser le développement d'une cirrhose biliaire. L'enfant est décédé à l'âge de 3 mois et l'examen anatomo-pathologique a révélé qu'il s'agissait d'une hépatite chronique avec début de cirrhose.

HÉMORRAGIES CONSÉCUTIVES À L'INTRODUCTION DE COMPRIMÉS DE PERMANGANATE DE POTASSIUM DANS LE VAGIN.—R. Simard.

L'auteur rapporte trois cas d'hémorragies vaginales graves consécutives à l'introduction dans le vagin de comprimés de permanganate dans un but abortif. Les propriétés caustiques de ce produit chimique provoquent de larges ulcérations, profondes, à l'emporte-pièce, teintées d'un brun noirâtre. Il ne semble pas que ces lésions entrainent l'avortement mais une erreur de diagnostic est facile et le médecin non averti peut s'y tromper et entreprendre l'évidement de la cavité utérine en croyant assurer ainsi l'hémostase. C'est l'absence de modification du col utérin et la recherche des ulcérations aux culs-de-sac vaginaux qui permettent d'éviter cette méprise dont les conséquences peuvent être fatales.

Correspondence

"Gurry Sores" in Newfoundland

To the Editor:

I read with great interest and enthusiasm the article "Medical Survey of Nutrition in Newfoundland" by Adamson, *et al.*, in the March issue of the *Canadian Medical Association Journal*.

However, I believe the authors are in error in attributing "salt water boils" or "gurry sores" to faulty diet. These lesions are the result of chafing from the stiff, salt encrusted edge of the oilskin sleeve. The same effect occurs on the back of the neck from the collar. In warm weather these men are surrounded by a perfect culture medium of fish offal or "gurry". Any abrasions or cuts are notoriously prone to infection and this is well recognized and feared by the fishermen.

This chafing and subsequent infection can be largely eliminated by the wearing of a brass chain sleevelet. This was invented by the fishermen themselves, but it requires continual education to keep them in use.

The "gurry sores" must not be confused with a somewhat similar type of lesion that appears when the fishermen are handling squid bait and is appropriately known as "squid hands". This I believe is due to a proteolytic enzyme in the body or sepia of the squid. The back of the hands and wrists become œdematous, the skin digests and large sores develop. These respond in the early stages to the salts of heavy metals such as lead lotion.

Answers to letters appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

The Lunenburg fisherman is comparatively much better housed and fed than his opposite number from Newfoundland. His diet is on a par with that of any prosperous section of Nova Scotia, yet "gurry sores" are almost as common among these men when they go to sea as the Newfoundland fishermen. Similar lesions occur among the hard rock miners, apparently from the clothes becoming wet from overhead drip and irritating the exposed skin. These are also known as "miner's boils".

A./SURG. CAPT. D. R. WEBSTER,
Asst. Medical Director General, R.C.N.
Ottawa, April 6, 1945.

Special Correspondence

The London Letter

(From our own correspondent)

HEALTH SERVICE PROGRESS

Since January, a negotiating committee representing the British Medical Association, the Royal Colleges and other professional bodies, has been meeting government officials to discuss various modifications in the government's proposals for a National Health Service. A report has been prepared on the present state of negotiations which have been concerned with the administrative side of the service, and this report which is confidential, has been considered by the council of the British Medical Association and by meetings of the Royal Colleges.

Early in May a special representative meeting of the British Medical Association is to be held in London to discuss the report together with the recommendations of the B.M.A. council. Meanwhile, a special committee has been set up under the chairmanship of Sir Will Spens to investigate the remuneration of general practitioners. Arrangements have been made for a statistical analysis of reports obtained from a representative sample of general practitioners and it is hoped that eventually a range of incomes will be recommended which will maintain the social and economic status of general medical practice in relation to the emoluments of other professions.

THE GREAT FLOUR MYSTERY

An article in the February issue of this *Journal* by Dr. E. W. McHenry on thiamin in bread indicated that this problem was not confined to the British Isles. A useful debate in the House of Lords recently raised quite a storm and a result of this undoubtedly has been the government announcement of a fresh investigation of the whole subject.

Briefly, white flour supplied before the war was about 70% extraction whereas since early 1942 it has been raised to 85%. For reasons which are not quite clear, this was reduced last year to 82½% with a further reduction of 80% in January, 1945. This would appear according to the experts to bring about a dangerous reduction not only in some of the vitamin B complex but also in the available iron, and it is possible that there are other essential nutrients which may be present when the whole grain is more nearly used, rather than a highly milled flour.

It is said that the "waste" from the millers goes to feed pigs and poultry, and that a return to white flour could be neutralized, so to speak, if vitamins and so forth were added to it. But as one expert has suggested, it would be better to keep the high extraction flour for humans and carry out experiments with regard to artificial enrichment among domestic animals. At least some credit for the nation's good health during the last few years has been attributed to the bread and flour available. Many consider that it would be a national disaster to return to the pre-war standards.

VISCOUNT DAWSON OF PENN

Several times during the past year it has been necessary to refer to the death of a distinguished member of the profession and indeed the losses sustained in the past few months have been serious and notable. Lord Dawson's name was known all over the world and much has been written of his service both to the nation and to the medical profession. He was a great character with unrivalled powers for knowing almost by instinct, the views of the ordinary doctor and, to a large extent also, of the general public. Under his guidance, the Royal College of Physicians became what it had been many years ago, a body exercising real leadership in the profession, and it was fitting that for the critical stage now reached in regard to the proposed a National Medical Service, he should have been chosen as President of the British Medical Association.

Many young physicians have cause to remember his encouragement and advice. Many patients, rich and poor, were devoted to him, for he had a habit of making friends wherever he went, with a charm clearly indicating a sensitive mind and a depth of humanity which go to the making of a great physician, a great statesman and a great gentleman.

ALAN MONCRIEFF.

London, April, 1945.

I believe the doctors are always at fault when the public does not understand them.—Chas. A. Mayo.

Miscellany

Doctor's Missing Book Found with Dead Japanese on Attu

When Dr. Edwin Lee, now practising medicine in Downey, Calif., was a student at the College of Medical Evangelists, class of 1938, he bought a copy of Kellogg's "Surgical Approaches to Anatomy", and put his name on the fly-leaf. One day it vanished from his bookshelf. He sought it in vain and finally bought another.

Recently he received the book from a former classmate, Major L. Lawrence Whitaker, medical officer with the American forces that took Attu. The major and another classmate had discovered it in a Japanese hospital on the island, following the occupation by the Americans. A letter from Major Whitaker told Dr. Lee of the weird incident of finding the book.

It seems that after the Americans had completed the bitter job of wiping the tenacious Japs out of Attu, Major Whitaker and a group of officers examined the garrisons where the Jap command had its headquarters. When they entered the underground hospital, they found eighteen of the Jap wounded had been killed by morphine.

They lay on their backs, their hands folded across their chests, stiff in cold death. The doctor, who had killed his patients, lay sprawled on the floor—he had put a bullet through his head.

As Major Whitaker and his former classmate got a look at the face of the dead doctor, they stared at each other in amazement—they knew him. He was Paul Tatsuguchi, their former classmate.

Tatsuguchi had been in college with them for four years. He had received his medical degree with them. He had taken the California State medical examinations with them and received his license to practise when they had.

The two officers found his personal effects and, in going through them, discovered a diary which he kept in English, during the last sixteen days when the Japs realized that resistance would prove useless.

He related what was happening as the battle of Attu began wiping out the Jap garrison and wounded soldiers were being brought into the hospital. He methodically set down the number of patients he was treating and what he was doing for each one.

Toward the end, he told how he had developed diarrhœa and how ill he was.

On the last day, when the Japs knew that the end had come, he described how he had killed each of his patients. Then turning his thoughts to his family, he wrote a farewell note to his wife and two children, who lived in Japan, hoping, possibly, that some American might read it and send it on.

In final rite, he wrote a rededication of himself to his Emperor, setting down a renewal of his oath and then, according to the grim evidence, took his life.

In addition to the diary, one of the classmates picked up a volume that had a familiar appearance—it was "Surgical Approaches to Anatomy", a book that recalled many memories.

The two examined it and there on the fly-leaf they found the name of Ed Lee. It had been crossed out and beneath it was written that of Paul Tatsuguchi.

[From *The Diplomate*, February, 1945, originally appearing in the *Kalends* of the Waverley Press, May-August, 1944.]

The Physician and the Public*

A COMMENTARY

The physician in Canada shares the lot, strange and inevitable, of the profession at large as far as his place in the popular mind is concerned. Actually the story of the average physician is a parochial one; his fortunes are those of the community in which he has lived and done his work, and within that sphere he works out his destiny. It is a satisfying if exacting rôle and has its own rewards. The few attempts which have been made to project the rôle into the severe pages of history have been prosaic and as dull as most annals of the parish. The world at large, however, and particularly its literary section have professed in recent years an intense interest in the figure of the physician and have discovered in him a romantic interest which has given a new direction and impetus to fiction. The average doctor in these pages is surrounded by an aura which even the exaggerated realism of Dr. Cronin's "The Citadel" failed to dissolve. Whether as detective or as surgeon balancing the scale of life and death, or as the modern knight surrounded by a retinue of "women in white", his is as thrilling and breathless a tale as of any adventurer of old along the golden road to Samarkand. It is all very colourful, but quite untrue, which is a pity. The world's tribute to the staunch old figure of the "family doctor" has been paid in the character of Dr. William McLure. This lurid technicolour appreciation, on the other hand, is a doubtful tribute to the modern specialist who carries on the old traditions of the legendary family doctor in a new guise. The truth is that the physician of today stands much closer to Chaucer's doctor than to any of the figures that handle the scalpel and the stethoscope in the modern novel.

* Reprinted by kind permission of Dr. E. P. Scarlett, from the Calgary *Historical Bulletin*, November, 1944.

It may be added that the profession itself is not without blame in this respect. Many of its members have supplied the gaping public with records which have further distorted the picture of the doctor-hero. To provide a corrective and restore some sense of balance to the records, physicians at large should request Somerset Maugham to apply some of his acid irony to the writing of the story of the average medical practitioner. He would be doing a great service to the profession in which he was reared and in which he first gained his clear insight into the ways of human life.

* * *

The foregoing remarks largely concern the attitude of the public toward the individual doctor, an attitude determined in part by an inherited respect for the doctor (which, it may be added, is fast disappearing) but more so by a faith in the modern doctor as specialist. In him they see a more powerful witch-doctor who will exorcise diseases by new charms or cures. For the fact remains (and here is the great gulf that divides physician and patient) that the great majority of people still think of diseases as primitive savages think of them—as so many evil entities each of which has its separate cure. Until the public gains a proper conception of the physician's function (and this involves a knowledge of the essential nature of disease), the present state of affairs will continue.

When one considers the attitude of the public toward the medical profession as a whole, one is bound to admit that a spirit of impatient criticism and even veiled hostility exists. There are many reasons for this feeling. Medicine has shared in the economic unrest of recent years. The public at large has come to look upon science as the great Aladdin and many feel that the benefits which might be expected to flow from medical advances are not being given to society in anything like full measure. In part this is due to an antiquated scheme of medical organization, to the ignorance and folly of the public, and certainly in a measure to a narrow and reactionary attitude on the part of individual physicians. For no longer may medicine pride itself on being one of the "liberal" professions. The insistence on intensive specialized training has resulted in making the physician a better craftsman probably but an infinitely less educated man and a poorer citizen (using the term in the best sense of the word). Nor does it seem that much improvement is possible as long as medicine remains a commercially competitive trade. The physician under the compulsion of modern forces has joined in the economic scramble, making it more and more difficult for the guiding humanitarian principles and the great traditions of medicine to maintain their influence. This is the dilemma of medicine at the moment.

And the solution? There is no precise answer to this question. Certainly under the impact of war and social changes a more effective organization of all the medical agencies is coming. The medical profession itself may in some degree guide such a new order. But its first duty is in another sphere. The quality of medicine depends on something other than organization. It depends on its standards, its sense of values, its spiritual outlook, its broad point of view based on education. If these are of the best it is much less important what social form medicine will take, for the medical profession will then be assured of the abiding faith of the public.

E. P. SCARLETT

Abstracts from Current Literature

Medicine

Subacute Degeneration of the Brain in Pernicious Anæmia. Adams, R. D. and Kubik, C. S.: *New England J. Med.*, **231**: 1, 1944.

The primary fault in pernicious anæmia is probably an atrophy of the gastric mucosa and this induces a deficiency of certain substances essential for the maturation of red blood cells. The cause of the nerve-fibre degeneration which so frequently occurs is obscure but may be the result of the deficiency of some other factor. Lesions in the cerebral white matter are not rare but have received little attention.

The pathological changes in the spinal cord and cerebral white matter in pernicious anæmia are similar, the essential change consisting of a more or less diffuse, though uneven, degeneration of the white matter with little or no proliferation of fibrous glia. These changes are unique and quite unlike those which occur in other cerebrovascular disorders or in pellagra. Spinal cord changes usually, if not invariably, precede the brain changes.

The literature is reviewed and two original cases reported in detail. The authors are of the opinion that the spinal cord and brain changes in pernicious anæmia represent an advanced stage in a specific process induced by a deficiency of certain substances necessary to the metabolism of myelinated nerve fibres. Not all patients will have demonstrable brain lesions but when they do occur and are widely disseminated mental disorders may be expected to accompany them.

N. S. SKINNER

Primary and Secondary Myelofibrosis (a Clinical and Pathological Study of Thirteen Cases of Fibrosis of the Bone Marrow). Erf, L. A. and Herbert, P. A.: *Ann. Int. Med.*, **21**: 863, 1944.

Myelofibrosis may be focal or generalized and primary or secondary. Five cases of primary generalized myelofibrosis, seven cases of secondary generalized myelofibrosis, and one case of focal myelofibrosis are presented. The classification, the clinical and laboratory findings, the biopsy and autopsy findings and the treatment of these cases are presented.

The etiology of myelofibrosis is unknown, however, such factors as occlusion of marrow vessels, temperature, organizers and hormones may be etiological factors.

Testosterone was used as a therapeutic agent in four of five cases of primary generalized myelofibrosis and one of the seven cases of secondary generalized myelofibrosis. A partial remission occurred in three of the four cases of primary generalized myelofibrosis. How-

ever, it has been observed elsewhere that in one case of myelofibrosis a remission occurred spontaneously. The results warrant further therapeutic trial of the use of testosterone for cases of primary generalized myelofibrosis.

Fibrosis of the marrow is probably much more common than is indicated by the number of published reports of these cases. The marrow of all cases of refractory anæmia, particularly those with myelophthisic or leukoerythroblastic anæmia, should be thoroughly studied before and after death.

Myelofibrosis is not similar to aplastic anæmia. The marrow is fibrotic in the former and fatty in the latter, extramedullary hæmatopoiesis exists in the former but not in the latter. S. R. TOWNSEND

The Mechanism of Renal Complications in Sulfonamide Therapy. Prien, E. L.: *New England J. Med.*, **232:** 63, 1945.

The sulfonamides may cause kidney damage either by the deposition of crystalline concretions or by a toxic action upon the tubules. The former mechanism is the most common and is brought about by two factors, the natural slowing of urinary flow into the calyx and the affinity of crystals for each other. This process is aided by diminished fluid intake and by any pathological obstruction to urinary flow.

The presence of sulfonamide crystals in ordinary urine specimens which are examined at room temperature is of doubtful significance in the absence of oliguria, hæmaturia or other evidence of renal irritation. Their presence in freshly voided specimens at body temperature calls for great caution in the continuance of drug administration.

A widely disseminated focal necrosis of the kidney tubules can be brought about by the toxic action of the sulfonamides without any precipitation of crystals. This was proved by biopsy in two cases who came to renal decapsulation because of anuria and a very elaborate technique was employed in the examination of the specimens to exclude the presence of any crystals. One of these patients survived, the other came to autopsy, where the toxic tubular necrosis showed some regression as compared with the degree evident in the previously obtained biopsy specimen. N. S. SKINNER

The Growth and Development of the Pelvis of Individual Girls Before, During and After Puberty. Greulich, W. W. and Thoms, H.: *Yale J. Biol. & Med.*, **17:** 91, 1944. (A Memorial Number for Professor Edgar Allen).

That the superior pelvic aperture of the female undergoes marked and rapid changes in size and shape during puberty is shown by anthropometrical and roentgenological studies at approximately annual intervals on 107 orphanage girls aged 5 to 15 years at the beginning of observation. These studies in 90 cases covered four years, and some were re-examined at the end of five or even six years. In the prepuberty period (the three or four years immediately preceding the menarche) this aperture is of long oval shape with an inward projection of each lateral wall medial to the acetabulum; and during this time it enlarges slowly and symmetrically. During puberty, on the contrary, its enlargement is rapid and asymmetrical, the transverse diameter increasing relatively more than the antero-posterior, the forepart of the outline becoming more rounded, and the acetabular constriction disappearing. This remolding of the superior pelvic aperture and pelvis canal, probably of endocrinal supervision, occupies about eighteen months. Subsequently there is but little change in the size and shape of the aperture. The onset of the remolding process precedes the menarche and fusion of the epiphyses of the distal phalanges of the hand, but follows the appearance of the "bud" breast and pubic hair. The work was done by the Adolescence Study Unit of the Yale University School of Medicine. C. C. MACKLIN

Penicillin in the Treatment of Experimental Infections with Bacillus Anthracis. Heilman, F. R. and Herrell, W. E.: *Proc. Staff Meet. Mayo Clinic.*, **19:** 492, 1944.

Anthrax, in spite of an apparent decrease in its incidence and fatality among human beings in recent years still remains an important disease problem in certain regions. Although antiserum, arsenicals and sulfonamides have proved of some value in its treatment, the use of these agents leaves something to be desired. The authors have examined the effectiveness of penicillin in the treatment of experimental infections due to *B. anthracis*. In the first experiment described, it was found that slightly more than half, (55%) of the animals treated with penicillin could be protected against 10,000 times the lethal dose of *B. anthracis*, even when sixteen hours had elapsed between the inoculations and the beginning of treatment.

In the second experiment, 40 mice were inoculated with *B. anthracis*. Of the 40 mice, 20 received treatment and 20 received no treatment. All of the treated mice survived. All of the untreated mice died within 96 hours after receiving the inoculation.

It is evident that infections with *B. anthracis* are susceptible to treatment with penicillin. S. R. TOWNSEND

Surgery

Orientation to the Mechanisms of Clinical Shock. Stead, E. A., Jr. and Warren, Jr.: *Arch. Surg.*, **50:** 1, 1945.

On theoretical grounds, it is clear that the clinical picture called shock can be produced by failure of one of several portions of the circulation; first, by inability of the heart to pump the normal amount of blood, because of weakness of the heart itself; second by pericardial tamponade; third, by the blocking of the main arterial paths, as in massive pulmonary embolus; fourth, by inability of the heart to pump an adequate amount of blood, not because of weakness of the heart, but because the venous inflow to the heart has failed; fifth, by generalized failure of cellular metabolism; sixth, by loss of normal vasconstrictor tone. The author deals at some length with each of these factors. Generalized failure in cellular metabolism is a frequent cause of the shock syndrome. Prolonged circulatory failure from hæmorrhage, loss of plasma or dehydration, can so damage the metabolic systems of the cells that recovery is not possible even though the circulation is temporarily restored. This condition is described in the literature as irreversible shock. The products of bacterial growth may likewise cause either reversible or irreversible cellular damage and produce the clinical picture of shock. Circulatory failure secondary to a generalized disturbance in cellular metabolism, also occurs in patients with severe burns after the first few days, in patients with severe hepatic damage, and in patients with renal failure or prolonged congestive failure. G. E. LEARMONTH

Hyperinsulinism Treated by Subtotal Pancreatectomy. "Hyperinsulinisme traité par la pancréatectomie subtotale." Brush, B. E. et McClure, R. D.: *Ann. Surg.*, **120:** 750, 1944.

Le critère permettant de diagnostiquer un adénome des cellules insuliniennes a été établi par Whipple. Ces symptômes, dont la présence commande une pancréatectomie, peuvent être ramenés au nombre de trois, d'où l'expression "triade de Whipple" désordres du système nerveux, hypoglycémie jusqu'à 50 mgm. par 100 c.c., soulagement par l'administration de glucose et rétablissant le métabolisme basal.

L'hyperinsulinisme peut être organique ou fonctionnel. Le sujet ne présente pas toujours conjointement les trois symptômes invoqués par Whipple, aussi le test de l'injection de glucose précédé et suivi d'une étude minutée du métabolisme basal est-il un des éléments prépondérants du diagnostic.

Les auteurs citent deux cas pour lesquels ils ont pratiqué une pancréatectomie subtotale croyant, d'ailleurs, se trouver ne présence d'un adénome des cellules insuliniennes. A défault d'adénome, ils constatèrent, après résection des 4/5 du pancréas une amélioration du métabolisme et d'excellentes conditions digestives. Une diète préopératoire adéquate, forte en protéines et faible en hydrates de carbone avait contribué au bon résultat obtenu.

L'hyperplasie des cellules insuliniennes est difficile à préciser du point de vue pathologique, de même qu'il est difficile de différencier dans ce cas une tumeur maligne d'une tumeur bénigne. Plusieurs auteurs ont déjà souligné cette difficulté. Dans les deux cas cités, les auteurs ont controlé par un examen microscopique leur diagnostic final. PIERRE SMITH

Skin Bacteria; Their Location with Reference to Skin Sterilization. "Bactéries de la peau; leur localisation par rapport à la stérilisation de la peau." Lovell, D. L.: *Surg., Gyn. & Obst.*, **80:** 174, 1945.

C'est un fait connu que les microbes sont assez peu nombreux à la surface de la peau immédiatement après un bon nettoyage par des procédés mécaniques ou chimiques. Peu de tempts après, spécialement sous l'influence de la transpiration, les microbes se multiplient rapidement et deviennent un facteur d'infection possible de la plaie opératoire. Ces bactéries nouvelles proviennent probablement des parties profondes de la peau et déjouent, par conséquent, les conditions habituelles de stérilisation pratiquée au cours des opérations, y compris les rayons bactéricides. Alors que les bactéries superficielles ou transitoires résident dans la graisse, les glandes sébacées, les folicules pileux, les crevasses de la peau, les bactéries profondes ou permanentes sont ancrées si profondément dans les glandes sébacées ou les folicules pileux qu'elles échappent aux antiseptiques et au nettoyage courant.

L'auteur décrit deux expériences qui l'ont amené à préciser la localisation des bactéries dans la peau et l'influence des méthodes de nettoyage chirurgical de la peau. Il souligne que la constitution anatomique de l'épiderme invite les microbes à s'y loger, de même que dans les canaux des glandes sébacées et les folicules pileux. A cause de leur structure les glandes sudoripares permettent plus rarement aux bactéries de se développer.

Le nombre de microbes se multiplie dès que l'on a des gants de caoutchouc et que l'on transpire par suite de la tension augmentée à la surface de la peau. L'acidité de la sueur est un agent bactériostatique, mais insuffisant pour empêcher la multiplication des bactéries. Les staphylocoques se multiplient facilement dans un milieu au pH voisin de 7.8. PIERRE SMITH

The Biopsy as an Accurate Guide to the Decision of Early Skin Grafting. Pritchard, J. E.: *Ann. Surg.*, **121:** 164, 1945.

Early skin grafting of a burn is desirable (1) to obtain skin coverage as soon as possible in order to prevent disability or loss of life from infection or wasting; (2) to restore the skin surface to a good functional condition; (3) to allow for earliest movement of joints, tendons, and muscles; (4) to prevent deformities and (5) for practical economy. It is important to determine whether the wound will heal satisfactorily, or whether it should be grafted. If destruction is deep enough to involve sweat glands spontaneous healing will not be satisfactory. Viable hair follicles indicate spontaneous healing will be satisfactory.

Specimens at least 5 mm. wide are removed at the time of the first dressing (13th or 14th day). Frozen sections are examined and the decision to graft is based on the microscopic findings.

Bloodless Circumcision. Birnie, J. M.: *New England J. Med.*, **232:** 218, 1945.

Circumcision, especially in adults, is often performed with too little regard for detail of technique. The infolded prepuce is skin and not mucous membrane and the prepuce as a whole is composed of two layers of skin and two of underlying connective tissue. The connective tissue contains blood vessels which may be quite large in the adult. The usual method of circumcision often results in hæmorrhage, œdema, swelling or even malformation.

The author's technique is to fully retract the prepuce and then, with tooth forceps, pick up the skin only. A small slit is made through which the blades of blunt-ended, small, straight scissors are inserted. By alternately pushing the scissors forward and opening them the skin is separated from the connective tissue without injury to the latter. Following this blunt dissection the flap of preputial skin of desired size and shape is removed. N. S. SKINNER

Obstetrics and Gynæcology

The Treatment of Placenta Prævia with Special Reference to the Use of Willett's Forceps. King, G. and Chun, D.: *Brit. M. J.*, **1:** 9, 1945.

A series of 134 cases of placenta prævia is reported, of which 16% were central, 40% marginal and 44% lateral in their situation. There was one maternal death (0.75%) in the series, and the combined stillbirth and neonatal death rate for all methods of treatment was 54.0%.

The child mortality rate accompanying the different methods of treatment was as follows: Cæsarean section 28%, rupture of membranes 37%, Willett's forceps, 56%, version 93%. An unusually high neonatal death rate was encountered in this series, due to the frequent combination of prematurity with malnutrition and B_1 avitaminosis in the newborn.

The use of Willett's forceps in the treatment of placenta prævia is advocated in cases in which Cæsarean section is contraindicated and in which artificial rupture of the membranes fails to control the hæmorrhage. ROSS MITCHELL

An Injection Study of Uterine Blood Vessels. Faulkner, R. L.: *Am. J. Obst. & Gyn.*, **49:** 1, 1945.

In the uterus carefully removed at surgical operations and the vessels injected with synthetic liquid latex with a standardized technique, the presence under ordinary conditions postmenstrually of an uninjectable zone surrounding the uterine cavity is observed again. Attempts were made without success to prove this zone an injection artefact. Morphologically, no change in the uterine wall in this zone was recognized except an increased compactness of uterine musculature. This region, after the period, resembles the myoma somewhat in its method of injection. In the premenstrual uterus this zone becomes spongy and is injectable. In some specimens with irregular uterine bleeding there may not be uniform injectability of the submucosa but a localized entrance of the injection mass here and there to the endometrium.

Since the type of endometrium has been rather conclusively found to have little connection with the fact of uterine bleeding, it would seem a legitimate effort to learn more if possible of the physiology of the uninjectable zone surrounding the uterine cavity. ROSS MITCHELL

Cæsarean Section Under Spinal Analgesia. Thomas, R. C.: *J. Obst. & Gyn. Brit. Emp.*, **51:** 324, 1944.

The number of infants delivered is 206 of whom 7 have been lost. The fetal mortality is, therefore, 3.39. This figure is considered low enough to justify the conclusion that spinal anæsthesia is perfectly safe for infants. This conclusion is also strongly supported by the fact that only one infant in 206 was stillborn; it was macerated, was one of twins, and the mother had a severe toxæmia. Among the 6 infants who died, atelectasis was the cause in 3, maternal toxæmia in a twin pregnancy. Prematurity associated with placenta prævia, and hæmorrhagic disease of the new-

born accounting for the other 3. None of them is attributed to the anæsthetic. Another fact which, in our view, gives even stronger support to the claim to safety for the infants is that in 8 instances, fetal distress from various causes, including 2 cases of prolapsed cord and 2 cases in which the cord was tightly round the neck, was the ultimate factor which decided the question of Cæsarean section, and that all these infants survived.

We have now recorded two series totalling 203 Cæsarean sections performed under spinal analgesia, of which 200 have been carried out under heavy nupercaine (Ciba). There was not a maternal death due to the anæsthetic, or a maternal death under anæsthetic from any other cause whatever.

Of the 203 patients operated upon, 2 died, one from pulmonary embolism on the 9th day, the other from sepsis on the 11th day. The over all maternal mortality is, therefore, 0.98%. Of the 206 infants delivered, 199 survived, giving a fetal salvage-rate of 96.6, or a fetal mortality-rate of 3.39%. None of the infant deaths could possibly be attributed to the spinal anæsthetic. Our confidence in heavy nupercaine (Ciba) as a safe and suitable drug for use in spinal anæsthesia in selected cases of advanced pregnancy remains unshaken. P. J. KEARNS

Premature Birth (Analysis of 1,000 Cases). Sandifer, S. C., Surg.-Lieut. R.N.V.R.: *J. Obst. & Gyn. Brit. Emp.*, **51:** 408, 1944.

Prevention of premature birth. Consideration of the first group of 372 cases—cause unknown—probably reveals the most hopeful field for future investigation. It seems highly probable that social conditions and status, together with the quality of the antenatal diet, play a large part in the production of these cases. It is important that further investigations should be carried out on these lines, as in the case of pulmonary tuberculosis in the population as a whole, using more definite standards of diet and social status than have been adopted in the few investigations so far performed, and remembering that the terms upper and middle class and "good" diet, are not synonymous. However, from the work of Ebbs *et al.* and the London experiment, it is seen that a definite and significant reduction can be achieved by the use of supplemented diets. Another great help would be the provision of a domestic help service for the last 6 weeks of pregnancy, so that adequate rest and freedom from worry could be obtained for every expectant mother. At present, help is available after the birth of the child, but surely it is just as important during the last 4 to 6 weeks of pregnancy. The problem of these 372 cases does not seem quite so formidable as at first sight. P. J. KEARNS

Anæsthesia

Methedrine and Postoperative Shock. Hudon, F. and Paradis, B.: *Laval Medical*, **10:** 110, 1945.

The authors believe that there is very considerable accumulation of blood in the capillaries and viscera in operative shock. This paralysis of small vessels is aided by the anæsthetic, inhibiting reflexes from the operation and by the opening of the abdomen.

At the onset of shock, a vaso-constrictor acting on small vessels may bring the blood back to the larger vessels. But, when shock is established not only does the peripheral circulation fail, but even that in large vessels. Blood volume is diminished, and it is not known exactly how to re-establish proper circulation. To date the authors have tried to inject fluids first and then methredine (usually about 10 mgm. intravenously and 20 mgm. subcutaneously in adults). In certain cases methedrine has been injected first. The heart is then able to contract on a sufficient blood volume to re-establish the capillary circulation. Liquids injected alone are soon lost in the capillary bed, but under the influence of methedrine capillaries regain their tone and enable the maintenance of the circulating blood volume. In severe shock other cardiac stimulants injected intravenously have had no effect and methedrine alone aggravated shock.

It is possible that by associating methedrine with other cardiac stimulants or other analeptics better results may be obtained. It has also been given in solution with physiological saline. This requires further investigation.

Results obtained with this drug are superior to those obtained by transfusion alone. With transfusion alone results appear only two or three hours later, and often the blood pressure falls again. With methedrine the results obtained seem constant.

SURG.-LIEUT. A. PASQUET

Neurology and Psychiatry

An Idiopathic Convulsive Disorder with Deterioration. Snyder, L. H. and Palmer, D. W.: *J. Heredity*, **34:** 207, 1943.

This disease syndrome is characterized by normal birth and growth until the patient is about one year of age. Then a series of spasms appears, somewhat like epileptic convulsions each lasting a few minutes, and followed by sleep or unconsciousness for 30 minutes to an hour. The spasms come in cycles, 4 to 6 spasms a day, then a week or 10 days of freedom. The children degenerate physically and mentally. Death usually occurs between 4 and 12 years. There has been no autopsy on any of these patients, but the signs and symptoms point to a new form of diffuse cerebral sclerosis.

The family in which this disease has occurred belongs to the sect of Mennonites, and there has been much intermarriage. In one family of 3 boys and 4 girls, whose parents were 3rd cousins, all four girls were affected, all boys were normal. A first cousin of the father of these children married a man who was doubly related to her, being her third cousin on his father's side and her fifth cousin on his mother's. She too had an affected daughter. In a third branch of the family, a woman (maternal aunt of the four girls with the disease) married a man supposedly not related, although he carried the same name as her mother's family. He was probably related because these two people had two of their three children affected with the disease.

In analyzing the mode of inheritance of this disease the authors state that it is dependent upon a recessive gene, and postulate that it is one which is partially sex-linked. That is to say, it is carried in the homologous parts of the X and Y sex chromosomes, so that it behaves as a recessive, but shows the added peculiarity of tending to occur in one sex only in any one family. Thus in one family the sons will show the disease, and in another the daughters, depending upon whether the father of the patients has received his defective chromosome from his father or his mother respectively. Crossing over may occur so that in some instances both sexes may be affected. The father of the four affected daughters presumably inherited his defective sex chromosome from his mother, as he was related to his wife through his mother. The father of the one affected daughter was doubly related to his wife, through both his father and his mother. In the third family, crossing over had occurred, so that a son and a daughter were affected. This is apparently a new syndrome, and one more condition which is presumably partially sex-linked.

M. T. MACKLIN

Familial Incidence of Tumours of the Brain, Cerebellar Hæmangioblastoma. Grossman, M. O. and Kesert, B. H.: *Arch. Neur. & Psych.*, **52:** 327, 1944.

Cerebellar hæmangioblastoma is a brain tumour which is usually associated with angiomatosis of the retina, or von Hippel's disease. Lindau, in 1926, discovered that this lesion was frequently associated with angioma of the retina and cystic anomalies in other organs of the body. The authors report four members

of one family with tumours of the brain. In two, the father aged 45 and the son aged 23, the tumours were removed surgically and were identified as true cerebellar hæmangioblastoma. In the other two members the type of tumour was not verified. A daughter, aged 24, was thought to have died of a tumour of the brain, but the operation was not completed nor was autopsy permitted following death. Another son, aged 19, was admitted to the hospital with all signs and symptoms of brain tumour. Because of the family history, the diagnosis was a probable hæmangioblastoma. On operation the dura over the cerebellar hemispheres was noted to be under greatly increased pressure and removal of the tumour was impossible. The patient died 6 hours after operation and autopsy was not permitted.

It is of interest that four members of one family, the father and three children, should have the same type of brain tumour. The remaining child in the family, a sister, is well and has been examined neurologically for the determination of the presence of a similar condition, but so far the examinations have proved negative.

M. T. MACKLIN

The Psychoneuroses of War. Henderson, J. L. and Moore, M.: *New England J. Med.*, **230:** 273, 1944.

The first 200 neuropsychiatric cases admitted to a hospital of the United States Armed Forces somewhere in the South Pacific were studied by the authors. They formed 23% of admissions and were classified as follows: anxiety neurosis 49%, hysteria 20%, constitutional psychopathic state 7%, schizophrenia 6%, manic-depressive psychosis 5%, epilepsy 4% and miscellaneous disorders 9%.

A disturbance in the family background was the most important predisposing factor. The type of psychoneurotic reaction was not related to degree of education. Past history of head injury was obtained in 30% but was rarely felt to have any etiological influence.

Occupational therapy, group therapy and sedation with phenobarbital were employed and hypnosis was considered valuable in a number of cases. Patients who develop a war neurosis easily have a poorer prognosis than those who carry on longer before breaking down.

N. S. SKINNER

Dermatology

Erythema Multiforme. Its Relation to Herpes Simplex. Anderson, N. P.: *Arch. Dermat. & Syph.*, **51:** 10, 1945.

In 1934 Forman and Whitwell in England noted that herpes simplex often precedes an attack of erythema multiforme and that recurrent herpes simplex is common in patients with erythema multiforme. They tabulated the many clinical similarities of herpes simplex and erythema multiforme as follows: (1) their tendency to recur; (2) their occurrence mostly in spring and autumn; (3) their provocation by infections, especially the common cold; (4) by injections of serums and vaccines; (5) in some cases by foods to which the patients are sensitive; (6) by menstruation, and (7) by sunlight. It has also been added that both entities may be produced by drugs, notably phenolphthalein; and that in many persons with diseases or conditions mentioned as etiological factors in production of erythema multiforme —pneumonia, menses and malaria—occurrence of herpes simplex is common.

Repeated vaccination with smallpox vaccine has been successful in about 80% of cases of recurrent herpes simplex thus treated, and in the remaining 20% the severity of subsequent attacks has been greatly mitigated. The procedure is to vaccinate by the usual method every 2 weeks for 4 or 5 times.

Anderson has used this procedure for some years for the prevention therapy of erythema multiforme associated with herpes simplex and also in treatment of erythema multiforme in which no such association could be determined. In several cases he has felt that the procedure has been of definite value in the prevention of recurrence of erythema multiforme, especially that preceded by herpes simplex. He believes that it should be used in cases of recurrent erythema multiforme unassociated with herpes simplex.

Ten cases in which the two entities were associated are reported by the author: 6 of these were treated by smallpox vaccination; 4 were free from recurrences for periods of observation ranging from 6 months to 5 years, and one other had only mild recurrences.

The occasional association of Vincent's stomatitis with an erythema multiforme-like eruption must be reviewed in the light of recently published work which views the virus of herpes simplex as the etiological agent of Vincent's disease.

D. E. H. CLEVELAND

Treatment of Lupus Erythematosus Disseminatus by Internal Administration of Iodine. Cannon, A. B.: *Arch. Dermat. & Syph.*, **51:** 26, 1945.

Some time previously the author saw in consultation a patient suffering with this disease, the diagnosis having been made by Libman and Sachs and confirmed by two other dermatologists. Following a roentgenological investigation in which a dye containing iodine was given, and to which the patient reacted violently with a temperature of 105°, nausea and continuous diarrhœa for 30 hours, on subsidence of these symptoms the symptoms of lupus erythematosus also disappeared.

As the mortality of lupus erythematosus disseminatus in acute types exceeds 90% and averages 50% in mild types this dramatic result prompted Cannon to investigate the therapeutic possibilities of iodine in this disease.

Five cases of disseminated lupus erythematosus, 2 of them classed as subacute, in which apparently successful results followed administration of iodine by mouth, are reported by the author. In addition to the iodine, high caloric diet providing from 3,000 to 5,000 calories daily, liver therapy and in one case blood transfusions were given.

D. E. H. CLEVELAND

Hygiene and Public Health

Pre-phthisical Tuberculosis. Mayer, E. and Rappaport, I.: *J. Am. M. Ass.*, **127:** 15, 1945.

The authors believe that the terms primary or first infection tuberculosis and reinfection type tuberculosis have now largely lost their meaning. "We do not know how many infections it takes to produce the classic primary complex (of Parrot, Kuss, Ghon, Ranke). Nor do we know how the progressive process of chronic pulmonary tuberculosis is produced." They prefer to consider tuberculosis in two broad stages, pre-phthisis and phthisis. Criteria for the diagnosis of the pre-phthisical state are: (1) Recently acquired tuberculin sensitivity with or without x-ray evidence of infiltration. (2) Recent simple pleurisy with effusion without x-ray evidence of pulmonary infiltration. (3) A persistent but stable x-ray lesion in the form of a sizeable homogeneous focus or a cluster of smaller interconnected foci.

A very important point to be decided in connection with a pre-phthisical lesion is: does it require treatment? This is obviously important since in all probability the great majority of cases do not progress to chronic disease. To treat all cases of pre-phthisis as though they were phthisis is wrong and impracticable because of the very large number. The safest and most satisfactory procedure is observation. This implies frequent x-ray and perhaps sputum and gastric analysis. Since the transition from pre-phthisis to phthisis may take years the observation should of necessity be prolonged.

FRANK G. PEDLEY

Industrial Medicine

Safe Practices in Working Magnesium. Stern, A. C. and Ford, C. B.: *The Iron Age*, June 22, 1944.

The effects of the reactivity and incompatibility of water with molten or burning magnesium and the ease with which finely divided magnesium dust can be ignited are illustrated by the record of a few typical fires and

explosions which have occurred in magnesium alloy fabrication plants during recent years. Insufficient knowledge of the prevention and methods for extinguishing the fires led to disastrous consequences.

After relating these cases the authors present the occupational hazards common to magnesium fabrication and summarize the safe practice measures necessary for their control. As a general precaution covering all magnesium handling, the local fire department should be informed that the plant is handling magnesium so they may be warned in advance against using water for extinguishing fires in it. Conspicuous signs should be placed on the outside of the building warning against the use of water to extinguish fires.

The fire and explosion hazards, and the approved safe practice recommendations are reviewed under the following headings: foundry precautions, structural requirements, melting magnesium alloys, crucibles and ladles, abrasive blasting, heat treating operations, finishing operations, machining and filing, grinding and polishing, and dust disposal. Persons in these foundries must possess knowledge of fire fighting methods recommended for magnesium. Standard materials and procedure approved by safety organizations are now available. Fire extinguishers are in three categories as follows: (1) Conventional extinguishers which should never be used on burning magnesium. (2) Extinguishers satisfactory for small or incipient magnesium fires. (3) Special proprietary extinguishing compounds approved for general use on magnesium fires.

Certain atmospheric contaminants as silica dust, fluorides, carbon tetrachloride, sulphur dioxide, and chromium compounds may exist in magnesium foundries. These are discussed, together with suggestions for their control. MARGARET H. WILTON

Guidance of the Disabled Veteran Returning to Work. Streets, B. F.: presented at the Annual Meeting of the Industrial Hygiene Foundation, Pittsburgh, Pa., November 15, 1944.

The author discusses briefly the practices of the Westinghouse Electric and Manufacturing Company. This paper completed the panel on "Putting the Disabled Veteran Back to Work", which occupied one session of the ninth annual meeting of the Industrial Hygiene Foundation, held at Pittsburgh in November. The plan has proved of inestimable value and has been gratefully acknowledged by most of the returned soldiers.

The returned soldier, after making formal application at the employment office, is given a working rank equal to that held at the time of induction. A tentative designation of a suitable specific job is indicated, employment to be arranged on the earliest possible date. Following this, the veteran is interviewed by a physician in order to obtain his complete physical and psychological evaluation. In addition to giving him a thorough physical examination a multitude of factors are discussed which, considered in their totality, help to interpret the veteran's outlook and problems. Among them are his family life, the physical and mental characteristics of his parents, and other children in the family, the history of family illness, their educational status, and financial background. In this interview an effort is made to appraise the man's personality.

After evaluation work is offered which will utilize the applicant's working endowment and at the same time minimize any traits which may constitute job-liabilities. Repeated interviews following employment are frequently held with certain applicants.

Figures are given concerning the employment experience during 9 months of 1944 and reasons for the veterans' discharges from service. The most common cause was psychoneurosis. A case report illustrates the problems and procedures. MARGARET H. WILTON

Re-employment of War Veterans. Wittmer, J. J.: *Indust. Med.*, **13**: 970, 1944.

In the opinion of the author, who is personnel and medical director of Consolidated Edison Systems, New York, the supervisor plays the most important rôle in veteran adjustment. It is his task to adjust and rearrange his force in such a way that each veteran will be placed, according to his qualifications or limitations, in the job where he can be the most effective.

All veterans are disabled from the standpoint that they must adjust themselves to an environment far different from that which they have encountered for the past several years. Each one presents a different problem. The former office boy who took officer's training, led his men through several years of warfare and returned as captain, is a case that needs a great deal of thought. Far easier to solve is that of the former engineer who took further courses in engineering and has had extensive experience in military engineering problems.

The author suggests for each plant a coherent practical working committee, to consist of the industrial relations director, medical director, educational director and the operating manager. In small plants, a personnel man can carry much of the responsibility. He can be educated to ascertain the mental abilities and aptitudes of the veteran and fit him into his job. Cases beyond his knowledge should be left for a doctor or psychiatrist. A chart should be set up in each plant showing the job classification together with basic physical requirements for each. All key jobs should be listed with a tentative pegging for each man in the service. Information, secured by correspondence, should be available regarding each veteran's experience in service, his future plans and his desires. The whole problem of re-employment and all plans should be discussed in detail by plant supervisors to acquaint them with their responsibility in helping the men make their adjustments. MARGARET H. WILTON

Obituaries

Dr. Andrew William Argue

AN APPRECIATION

On February 5 just passed, the profession of Saskatchewan was called upon to pay its last tribute to one of the few who came to these prairies in the nineties. This man was the late Dr. A. W. Argue, known to the profession of Canada from the Atlantic to the Pacific.

On behalf of the profession in Saskatchewan I wish to pay this tribute to a great man as well as a friend known to every man practising in the Province. He belonged to the West, a graduate of Manitoba in 1897, he began practice in that beautiful village of Grenfell which more than any other district showed the picturesque country side much like that left behind in England from which many of the early settlers came. No wonder that a man such as Dr. Argue should love such a district and to this place he gave his life, though the last four years he spent chiefly in Saskatoon as Registrar of the College of Physicians and Surgeons, on whose council he had been a member from its inception. He never forgot Grenfell and every few weeks found him back at his home and with his old friends, and when he passed away it was to be laid to rest with his wife in his home town at Grenfell. Dr. Argue, and many doctors of this province who had passed on before him, were men of exceptional character and ability and to them the profession of Saskatchewan owes its guidance, an example which we believe has given to the profession in this province those higher qualities of character.

No greater tribute could be given to any man than that of Dr. J. S. Thomson, President of the University of Saskatchewan, who travelled to Grenfell to pay his tribute to his friend and co-worker as Dr. Argue was a member of the Board of Governors.

Dr. Thomson's address on the occasion will be long remembered when he expressed the thoughts of himself and other friends as follows: "It was granted to our friend (Dr. Argue) who has gone from us not only to

live long but to live well and to give a visible evidence of the essential goodness of human existence''. Dr. Thomson also spoke of the gracious ministry to the people of a community where his life work was given.

Dr. Stuart Lindsay, Dean of the Medical College was present as representing his many friends of the University, also members of the Council with whom he had worked for so many years.

Dr. Argue was born at Stittsville, Ont., in 1862 and came west in 1893. He taught school for a few years. Dr. Argue was a conservative in politics and represented his constituency in the early years of the province. The doctor was president of the Council on two occasions. He was Registrar during the last four years to allow Dr. J. G. K. Lindsay to give his services to his country overseas. He was President of the Medical Council of Canada at the time of his sickness and death. It was because of his close association with the Canadian Medical Association that he was so well known to the profession of Canada. J. A. VALENS, M.D.

Dr. Lorimer John Austin, Professor of Surgery in Queen's University of Kingston, Ont., died, after two years of illness, on March 20.

Dr. Austin was born in London, Eng., in 1881. He was the son of Mr. James Valentine Austin who became a judge and moved to Bristol. His mother was the former Annie Lorimer. His academic career was brilliant. He was graduated B.A. from Clifton College in 1903 and M.B.(Cantab.) in 1906. In 1908 he attained the M.A. and M.Ch. degrees from Cambridge as well as the F.R.C.S. England. For six years he worked in the London East Hospital and went to France as second in command of a British Red Cross Unit. After a short experience of war in Namur and Mons he and another member of his corps were taken prisoner, the first British officers to meet that misfortune. After six months he was repatriated through the Netherlands and was commissioned Major in the Royal Medical Corps.

After the war he remained in Bristol for two years and came to Canada in 1920. He was at once appointed Professor of Clinical Surgery in Queens and, on the death of Professor Mundell in 1923 was made Professor of Surgery. Ill health caused his retirement in 1943.

Dr. Austin was a charter member of the Royal College of Physicians and Surgeons of Canada, Fellow of the American College of Surgeons, Member of the Canadian Association of Clinical Surgeons and Fellow of the Academy of Medicine, Toronto. He was very active in the Canadian Medical and Ontario Medical Associations. He was president of the latter in the session of 1931-32. In 1944 he was awarded the medal given by the Alumni Association, Montreal, to the person judged to have done outstanding service for Queen's.

In Kingston Professor Austin held to a unique degree the affection and esteem of his fellow citizens. He was constantly ''doing good by stealth'' to people in distress especially helping handicapped children and young men to better their condition. One of his friends once said ''every cent he spent made someone happy''.

As a teacher he was the admiration of his students. As a lecturer he was known and appreciated by the profession all over Canada for he travelled widely and always gave of his best. Very few men from Britain ever became so thoroughly a Canadian in so short a time.

Dr. Austin is survived by his sister Miss Margaret Austin.

Dr. Antoine Emmanuel Belleau, well known resident of Ottawa and father of Bishop Henri Belleau, of the James Bay missions, died on March 16, at the age of 90.

A native of Beauport, Que., Dr. Belleau studied at Laval University, Quebec, where he graduated in medicine. He practised his profession at Levis and Rimouski until 1882, at which time he had to give up his profession because of failing eyesight.

Dr. Belleau came to Ottawa the same year and joined the staff of the Public Works Department where he remained until his retirement in 1927. In 1891 he was married to Emma Miville Deschesne, who died in 1942.

Dr. T. H. Belt died on March 7. He was born in 1901 and was a graduate of Toronto University in 1928.

Dr. Howard Black, prominent physician and surgeon of Woodstock for the past 20 years, died on March 1, following a long illness. Dr. Black was in his 59th year.

Born in Stroud, Ont., son of the late Mr. and Mrs. James Black, deceased graduated from University of Toronto Medical School in 1915, and served overseas as medical officer of the 21st Canadian Infantry Battalion. Following his discharge at the end of the war, Dr. Black took a postgraduate course at Toronto, and later studied medicine in London, England. He held the following degrees: M.R.C.S. (London); L.R.C.P. (England) and I.R.C.P. (England). In 1926, he was licensed by the American Medical Association.

Following completion of his postgraduate work, Dr. Black practised in Moose Jaw, Sask., where his first wife, Hally Johnston, daughter of the late Mr. and Mrs. Robert Johnston, of Woodstock, passed away in 1922. The following year, Dr. Black came to Woodstock and joined the firm then becoming Sinclair, Stevens and Black. In March, 1940, Dr. K. B. McKenzie joined the partnership, Dr. Sinclair passing away in August, 1943.

Dr. Black, who specialized in surgery, was a member of Oxford Lodge A.F. & A.M., being master in 1931; also Oxford Chapter, R.A.M.; Knights Templar Preceptory, London; and Mocha Temple Order of the Shrine, London. A member of Chalmers United Church, he was a past president of the Oxford Conservative Association and of the Oxford Medical Association. He was also a member of Olive Branch Lodge, I.O.O.F.

In September, 1930, Dr. Black was married to Edythe Kitchen, of Brantford, who survives; also one son, Flying Officer Robert J. Black, R.C.A.F. (overseas); and a stepdaughter, Mrs. W. M. Reynolds (Phyllis) Woodstock.

Dr. Carl A. Brownson, well-known Picton and Belleville physician, died in Prince Edward County Hospital, Picton, early Monday, February 12, following an illness of three weeks' duration. He was in his 45th year.

Born in Stirling the only son of Mr. and Mrs. Charles Brownson, who at present resides in Picton, the late Dr. Brownson received his early education in that district. His only sister, the late Mrs. James Gough, predeceased him eight years ago.

Showing an early tendency toward medicine, he later attended Toronto University graduating from that institution in Arts and medicine. During his early college days, he became associated with Dr. J. J. Robertson of Belleville, and later following graduation, served as his assistant for two years. He interned at Toronto General Hospital.

He spent nearly ten years in New York City, where he was associated with the Wall Street Board of Trade in physician's capacity. Returning to his native Canada, he practised in Bloomfield for a number of years, removing from there to his late practice in Picton, a few years ago.

In Picton he was a charter member of the Rotary Club of that town and being intensely interested in child welfare was chairman of the Crippled Children Committee of that service club. A musician of repute he organized a choral club within Rotary, and also gave his services to community welfare in many other phases of work. One of his hobbies was horticulture and his beautiful gardens and floral effects were the cynosure of many flower-lovers' eyes. He was active in fraternal circles being a member of the Masonic Order, R.A.M., the Preceptory and Rameses Shrine.

Dr. C. F. Burt (formerly of Alliston, Ont.), died on November 23, 1944. He was born in 1903 and was a graduate of Toronto in 1926.

Dr. Andrew Austin Cameron, aged 50 years, recently attached to the staff at Deer Lodge Military Hospital, died at his house in Winnipeg, Man., in February. His wife, who survives, was the former Mary Werte.

Dr. Cameron was born at Shelburn, Ont., and graduated from Queen's University, Kingston, in Kingston, in 1920. He served in the first Great War from 1916-18 with the Royal Naval Air Service as a pilot.

He practised his profession in Rainy River, Ont., from 1924 until 1941, at which time he joined the R.C.A.S. as senior medical officer recruiting in 1944 and was appointed to the staff of Deer Lodge hospital.

Dr. Cameron was a life-long member of the Masonic order and affiliated with Rainy River Lodge of which he was a Past Master. He also served as district deputy Grand Master in Rainy River district of the Grand Lodge of Canada and was active in the work of the Chapter of the Royal Arch Masons in Western Ontario.

Dr. Cameron was also a keen sports enthusiast and interested especially in golf, curling, hunting and shooting.

His only son, Bill, a Toronto medical student, was accidentally killed in 1942 while he was training as a pilot with the R.C.A.F.

Surviving besides his widow, are two daughters, Bette and Phyllis, both students in home economics at the University of Manitoba; three brothers, Dr. W. H. Cameron, Toronto; Cecil, New York City, and Edison, Oshawa, Ont., and one sister, Mrs. Thomas Murphy, Deville, Sask.

Dr. Peter McFarlane Carter. After a period of failing health, Dr. Peter McF. Carter died at his home in Sydney, on April 3. He was born in Antigonish and, after attending St. Francis Xavier University, he entered the Dalhousie Medical School where he graduated in 1907. He practised continuously since that time in Sydney.

Dr. A. J. Charlton, aged 74, died on March 3, at Des Moines, Iowa. He had been a patient there since suffering a heart attack in December.

He was born on a farm near Aylmer, Ontario, on May 3, 1870. After preliminary schooling in the province, he left his native country and came to the United States to take up the study of medicine, graduating from the University of Ann Arbor, Mich.

Surviving are two brothers, the Rev. W. G. Charlton, of Toronto, Ont., and Ansel E. Charlton, of Aylmer, Ont., and one sister, Mrs. Kate Hood, of Oakland, Calif. A brother, Thomas, passed away eight years ago. His wife and two infant children preceded him in death.

Dr. Hugh Herbert Christie, aged 67, supervisor of medical services for the mobilization section of National Selective Service, died March 20 after a lengthy illness.

Born in Martintown, Ont., in 1878, he graduated from McGill University and in 1906 started his medical practice at Esterhazy, Sask. In 1935 he was awarded the King George and Queen Mary Jubilee Medal for long and outstanding service in the medical field and two years later received the Coronation Medal.

From 1905 to 1906 Dr. Christie was president of the McGill Medical Society and from 1935 to 1936 was president of the Saskatchewan Medical Society. He was appointed member of the Medical Council of Canada in 1939 and came to Ottawa when he was appointed supervisor of medical services for Selective Service in 1940. Survivors include his widow, one son and a daughter.

Lord Dawson of Penn

[*We republish the following comment from "The British Medical Journal", of March 17, 1945, on the late Lord Dawson of Penn who died on March 7 at the age of 81. Lord Dawson was well known in Canadian medical circles and we would pay our tribute to his memory.*]

Lord Dawson of Penn died in the early hours of March 7, and the profession mourns his passing. The world at large thought of him as a "royal doctor", physician to four Kings of England, but to medical men and women he was more than that: he was our senior statesman, admired for his courage and wisdom, and loved for his kindness and charming approachability. Young and old of every degree gave him their confidence. Bertrand Dawson had no flying start in life: he carved out his early career by hard work and determination. Good fortune came his way but could not spoil him. If he made few contributions of his own to the science of medicine he had an abiding interest in medical progress and its practical application. This thirst for knowledge from every source, joined with clinical acumen, shrewd judgment, and exquisite tact, earned him fame as a consultant. Other qualities which he possessed—a high sense of public duty and the gift of speech—were seeking an outlet at the end of the last war, when he rose to the front rank in medical affairs. Thenceforward he stood out as a leader, holding fast to all the traditions he thought good and worthy to be preserved, but conscious of a changing world and of the need to look ahead and around. He was the first medical man in active practice to be created a Peer, and he soon made his mark in the House of Lords when matters affecting the health of the people came up for debate.

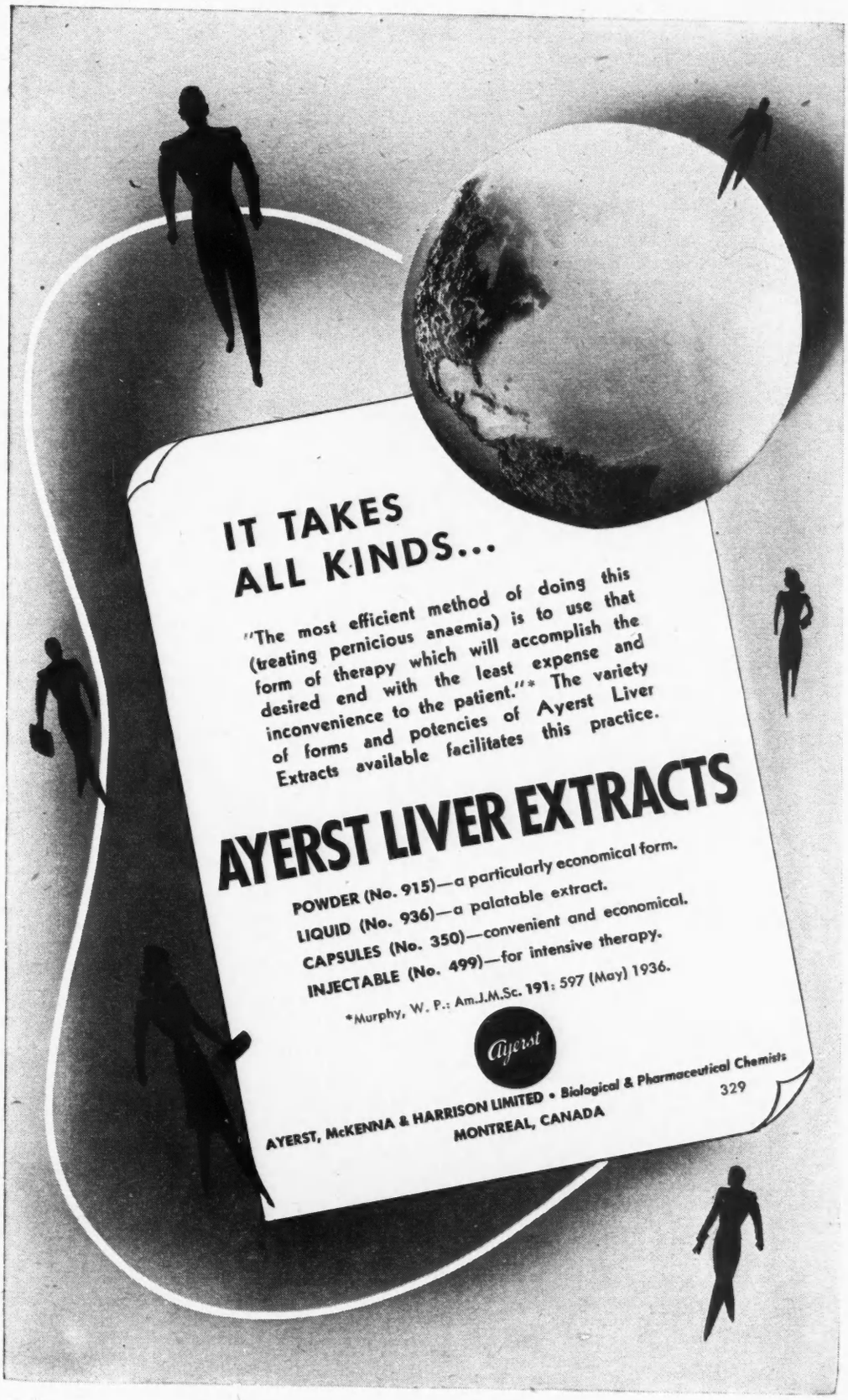
Sympathetic with the forward movement in medical practice and organization, well aware of the needs and apirations of our profession, Lord Dawson believed in the British Medical Association and acted up to his belief. His long Presidency of the Royal College of Physicians of London gave him the power to instil fresh life into that ancient corporation. As a member of Council of the British Medical Association he had been diligent in attendance and constructive in outlook, and when the Centenary approached it was inevitable that he should be chosen as President of the Association: in the celebrations of 1932 he did wonders as the central figure. That eventful year was not the end of his interest in the work of the Association, nor as it turned out) of his willingness to hold office again if asked to do so. Lord Dawson served as an ordinary member of the Medical Planning Commission without reminders of his disappointment at the pigeon-holing by the Government of the report which his Consultative Council put out in 1920. Then in 1943, and again last year, the British Medical Association called him once more to its Presidential Chair. He accepted the unique honour as a duty to his fellow-members, and in that spirit declined no request from headquarters when his influence or help was sought. Even in the last few months, after a severe operation, he kept in touch with the course of events.

Dr. Frederick Walter Diamond, aged 55, died suddenly on April 1 from a heart attack at his home. Dr. Diamond was the physician for Trinity College School and was also on the staff of the Port Hope Hospital. Born at Queenborough, Ont., he had received his early education at Madoc High School. A graduate of Queen's University in medicine in 1915, he went overseas with the R.C.A.M.C., transferring to the R.A.M.C., and saw service during the first Great War in Ireland, Malta, Egypt and Palestine. Returning to Canada after the war, he practiced for several years in Cold Springs prior to coming to Port Hope. He was a Mason and a Rotarian.

Surviving are his widow, Helen Irene Davidson Diamond; two daughters, Ruth a student at Queen's University, and Helen Ann, at the University of Toronto; two brothers, J. A. Diamond, Toronto, and W. F. Diamond, Detroit, and two sisters, Miss Minnie Diamond and Mrs. T. R. Dolan, both of Belleville.

Dr. James V. Gallivan died suddenly on April 1 at Hastings, Ontario.

Dr. H. H. Huenergard, Kitchener, Ont., died on February 2. He was born in 1884, and was a graduate of Toronto University in 1906.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*Murphy, W. P.: Am.J.M.Sc. 191: 597 (May) 1936.
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Dr. Henry Thomas Hurdman, died at his home in Bryson on March 21, at the age of 85 years. He had been ill for some time.

His grandparents, Mr. and Mrs. Henry Hurdman, came to Canada from Ireland in 1820 and settled in the rich agricultural area of Pontiac County, near Aylmer. Acquiring his early education from private tutors, Dr. Hurdman entered McGill University in 1881, graduating in 1885. He practised at Fort Coulonge, later moving to Bryson in March, 1887, where he had since resided. For 40 years, he was secretary-treasurer of the Pontiac County Council, in addition to being secretary of the municipality of Bryson village for more than 35 years, and latterly assistant secretary.

In 1933, Dr. Hurdman figured prominently in the burning of old railway bonds of the county which he and W. R. McDonald, M.P., were given much credit for having refinanced many years ago.

He was active in the United Church and was for many years affiliated with the Masonic Order and the Independent Order of Oddfellows.

Besides his widow, the former Emma Clarke, whom he married at Moorehead Station in 1896, are two sisters, Mrs. Anna Ritchie and Mrs. E. M. Grimes.

Dr. Eldridge D. King, son of the late Rev. and Mrs. J. K. King, of Sackville, N.B., died in Boston on March 5.

A graduate of Mount Allison University and Harvard University, Dr. King practised in Boston for almost 50 years. He was well and creditaly known in his profession, counting among his patients many of the most prominent families of Boston and vicinity.

Born at Sackville, N.B., he married Eleanor Coultier, of Fredericton, and is survived by one son, Coulter King. Also surviving are one brother, LeRoi A. M. King, Saint John, and three sisters, Mrs. Robert J. King, New Canaan, Conn.; Mrs. James D. MacMillan, Campbellton, N.B.; and Mrs. C. E. Ball, Calgary, Alta.; Mrs. Edward Lounsbury, of Fredericton, N.B., is a niece.

Dr. Oscar Kennedy Lang, aged 63, for many years a specialist in dermatology in New York City, died in Toronto on March 10. He had been in poor health for two years.

Dr. Lang was born at Granton and attended St. Mary's High School. He graduated in medicine from the University of Toronto and for a few years practiced with his father, the late Dr. Hugh Lang, in Granton. After postgraduate study in New York City in dermatology, he practiced there for some years. He was a Mason and a member of Nu Sigma Nu fraternity.

Surviving are his widow, Bessie Butler Lang; two sons, Lieut. Hooper Lang, with the U.S. Army in Italy, and Cpl. Hugh Lang, with the U.S. Marines; two brothers, Dr. Charles Lang, New York, and C. G. Lang, Toronto, and a sister, Mrs. Owen.

Dr. Walter C. Murray, aged 78, president emeritus of the University of Saskatchewan, died on March 23. He was president of the University of Saskatchewan from 1908 to 1937.

Dr. George W. McGill, aged 60, died in Toronto on March 19, while addressing a meeting. A native of St. Thomas, Ont., Dr. McGill taught in several Toronto schools, at one time serving as Inspector of Public Schools for Ontario. He was a past master of St. Andrew's Lodge, No. 16, a Royal Arch Mason, a Knight Templar and a member of the Rameses Temple of Mystic Shriners.

Surviving are three sisters. He was predeceased by his wife a short time.

Dr. Thomas Wills Gibbs McKay, aged 72, medical officer of health for Oshawa since 1905, died at his home here on March 24.

A graduate of the University of Toronto, he received his medical degree in 1896 and commenced practicing in that year. At one time an examiner in primary anatomy in the College of Physicians and Surgeons in Ontario, he later became an associate examiner in clinical surgery.

Besides his widow, the former Ina Drew, he is survived by two sons, Sqdn.-Ldr. Wilson G. McKay, Camp Borden, and Spr. Ian B. McKay, in service overseas.

Dr. H. C. McKenzie. We regret to record the death of Dr. McKenzie, of Williams Lake, B.C. He has been well-known in the Cariboo District for many years, and his loss will be severely felt.

Dr. Fred J. Nickle died at his home in Madoc Village on March 12 after an illness of six months' duration.

Born in the United States fifty-three years ago the late Dr. Nickle was the son of Mr. and Mrs. W. D. Nickle. He received his early education in Madoc and on graduation from high school there he studied at Dalhousie University, Halifax, and later at Toronto University from which institution he received his degree in medicine. He commenced the practice of his profession at Merrickville, later moving to Eldorado and eventually he took up residence in Madoc. For thirty-five years he resided in Madoc and district and his practice was extensive. Dr. Nickle was successful in the practice of his profession and he enjoyed the confidence and respect of his patients. In the regard of many friends he held a high place and his death has caused universal regret in the district.

During the First Great War Dr. Nickle served in the Royal Navy and at the time of his death he was Medical Officer with the rank of Captain, 2nd. Reserve Battalion, Hastings and Prince Edward Regiment. He was a member of Trinity United Church, Madoc, and fraternally he was a member of Madoc Masonic Lodge No. 148, Madoc Oddfellows Lodge and Nickle Royal Orange Lodge.

Surviving him are his wife, the former Grace Burnside; his mother, Mrs. W. D. Nickle; one son, Presley, with the R.C.N.V.R., one daughter, Miss Anne Nickle at home; two sisters, Mrs. T. E. Burnside, Madoc, and Mrs. Alice Wiley, Wooler.

Dr. Ross Prendergast died in Montreal during March.

Dr. Prendergast was a graduate of Queen's and McGill universities. He was partly responsible for the establishment of the "milk depots" in Montreal's east end.

Dr. A. E. Ranney, North Bay, Ont., died on September 20, 1944. He was born in 1878 and was a graduate of Trinity College, 1901.

Dr. John A. Reid, of Sudbury, Ont., was killed in a motor accident on March 19, when his automobile struck the abutment of an overhead bridge near Markstay, Ont., about 18 miles east of Sudbury. He was on his way to answer a sick call.

Dr. Reid was born in Fredericton 28 years ago, a son of John A. and the late Edna (Golding) Reid. He attended Fredericton schools, the High School and the University of New Brunswick for three years, leaving to take up the study of medicine at McGill. He was graduated from McGill in 1940 and was an intern in the Homœopathic Western and General Hospital, Montreal; for a year he was plant doctor at Nobel, Ont., and later plant doctor at Vickers in Montreal. He then went to Sudbury where he was carrying on his practice. He had a great many friends in Fredericton and other places where he lived who will learn with profound regret of his death at such an early age. He is survived by

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Holmes was born in Cadiz, Spain. The ship in which his parents were travelling was captured by a French frigate and they were interned there. In 1801 the family arrived at Quebec, later moving to Montreal. Holmes was a pupil of Dr. Arnoldi, later continuing his studies abroad. In the year 1819 he returned to Canada and practised with his former teacher.

A dark man, short and slight in stature, Holmes was slightly stooped. He had a quiet, retiring manner but possessed an abundance of zeal, diligence and alertness. Christian principles characterized his life and he was known and respected for his beliefs.

Much of his free time was devoted to the study of the natural sciences. His extensive collection of the plants of Canada he presented to the Redpath Museum of McGill University. The library of McGill also benefited by his energies and he contributed, in no small measure, to building its collection of books.

Holmes was one of the first physicians in charge of the Montreal General Hospital and a member of its medical board. He was also active in all professional associations and for three years was president of the College of Physicians and Surgeons of Lower Canada.

On October 9th, 1860, Andrew Holmes passed away suddenly. The Holmes Gold Medal awarded for the highest aggregate of marks obtained in the medical course was established in his honour in 1865. The ambition of Andrew Holmes to elevate the practice of medicine in Canada, still further encourages William R. Warner & Company to maintain their policy of Therapeutic Exactness . . . Pharmaceutical Excellence . . . One price and one discount to all.

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his father, John A. Reid, his stepmother, a brother, J. Winston Reid, Fredericton, and a sister, Miss Helen Reid, V.O.N., Montreal.

Dr. R. S. Stevens, Ottawa, died on February 7. He was born in 1887, and was a graduate of Queen's University in 1912.

Dr. Gerald Pope Tanton. Word has been received that Dr. Tanton, of Summerside, P.E.I., has been killed in action Overseas. He graduated from Dalhousie in 1935 and before enlisting carried on an active practice at Moser River, Halifax County.

Dr. C. A. M. Thrush, died at Alliston on March 22. He was a graduate of Toronto University in 1906.

News Items

Alberta

Dr. J. Ramsay, Teviotdale, has recently been honourably discharged from the Forces, and has joined the Baker Clinic in Edmonton.

Dr. J. F. Adamson, who has practiced for many years in Edmonton, has recently moved to Streetsville, Ontario.

Dr. S. Siegal, a graduate of Dalhousie University, has been honourably discharged from the services and has gone to Cardston to practice.

Great disappointment has been felt in municipal circles in Calgary owing to the fact that the Department of Militia at Ottawa has not permitted the City to use an airport hospital now vacated, as an emergency civic hospital. It was felt that this could be used for a considerable time before it was necessary for the Department of Pensions and National Health for any returned soldiers.

The Workmen's Compensation Board is greatly disturbed by the action of the Miners' Union in demanding that certain commissioners should be dismissed, because they consider greater disability allowances should be given to a few injured miners. All these cases have been reviewed and reported on by at least ten well-known medical practitioners, and on the basis of the disability reported, the Board has adjusted the claims. The Union got some other doctors to pass on these cases and these latter estimated the disability to be greater than was considered to be the case by the men who had charge of them, or had reviewed them. If there is no finality to a case, after being carefully considered by many physicians, what is the future to be? Should the Act be amended, and should a Judge with no medical knowledge, give the decision?

The Provincial Government has amended its regulations, which gives free hospitalization for maternity cases to permit a patient to go to a hospital outside the Province, which might be nearer the patient's residence, and thus get the free services there, by the Government paying the bill.

The Provincial Marriage Act requires an applicant for a marriage license to have a blood specimen taken by a physician within fourteen days before the application, or the first publication of banns, and a certificate to that effect, filed. "No issuer shall issue a marriage license, nor shall any minister or clergyman publish the banns of a marriage unless there has been filed with the issuer or with the minister or clergyman, as the case may be, a certificate of a duly qualified physician registered in and for the Province of Alberta, in Form H., of the Schedule in respect of each party to the intended marriage, certifying that a specimen of blood for the serological test for syphilis has been taken from the applicant and has been sent, or will be sent, to the Provincial Laboratory, or to a laboratory approved by the Director of the Provincial Laboratory, and that the result of the test will be conveyed to the applicant, and showing that the specimen was taken within fourteen days prior to the application for the license or the first publication of banns." There is no provision made for the prohibition of the marriage even though there may be a positive report.

The Public Health Act has been amended, giving power to the Council of any city, town or village of a population of 300 or over, to pass a by-law following a plebiscite requiring milk sold, to be pasteurized before being sold, offered for sale, or delivered. A producer, however, may bring his milk non-pasturized to a distributor, a milk-processing plant, creamery or cheese factory.

G. E. LEARMONTH

British Columbia

The Legislature of British Columbia has announced a program of buildings at the University of British Columbia to provide increased laboratory and lecture room capacity and new buildings connected with the work of the Public Health Department of the Province. We are assured that a medical school will materialize some time within the next three years. In view of the urgency of the situation this is rather unsatisfactory, and it is hoped that the authorities may be induced in some way to take speedier action.

The elections to the Council of the College of Physicians and Surgeons of British Columbia held recently give the following returns: District No. 1—Dr. Thomas McPherson of Victoria; District No. 3—Colonel Wallace Wilson, Vancouver; District No. 4—Dr. E. J. Lyon, Prince George; District No. 5—Dr. F. M. Auld, Nelson, returned by acclamation.

The speaker at the recent meeting of the Vancouver Medical Association was Lieut.-Col. Rocke Robertson, R.C.A.M.C., who spoke on, "Activities of a Field Surgical Unit".

Steps have been taken to create a fund as a memorial to the late Doctor A. W. Bagnall, the earnings from which shall be expended on books and periodicals. The section thus formed will be known as the A. W. Bagnall Historical Collection.

Doctors Frederic Brodie and J. W. Welch were recently elected to Life Membership in the Vancouver Medical Association. Elected to Active Membership in the Association at the same time were Doctors R. G. Langston and K. H. Wray-Johnston.

Lieut.-Col. D. H. Williams, R.C.A.M.C., has returned to civilian practice in Vancouver. Dr. Williams is well-known throughout Canada and the United States for his work from a public health point of view.

Others who have returned to civilian practice are Lieut.-Colonel H. C. Davis, R.C.A.M.C., who is now in San Francisco; Squadron-Leader G. A. Lawson, who is now Director of the Department of Physical Medicine in the Colonel Belcher Hospital, Calgary, Alberta; and Major C. H. Ployart, R.C.A.M.C., who is now with the Rehabilitation Department of the Workmen's Compensation Board in Vancouver.

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Two British Columbia medical men on active service, Acting Major G. E. Langley, of Vancouver, and Captain N. B. Hall, formerly of Campbell River, have returned to Canada suffering from wounds received on active service. They are both doing well.

Victoria has lost one of its most prominent members in the death of Dr. Forrest B. Leeder, who was well-known, not only for his excellence as a physician, but as a leader in all medical matters, having been president of the Victoria Medical Society and President of the Canadian Medical Asssociation.

At a recent investiture at Government House, Victoria, Surgeon Commander R. H. Ruttan was invested with the O.B.E.

J. H. MACDERMOT

Manitoba

A bill to incorporate Manitoba Medical Centre and Associated Hospitals was passed in the recent session of the legislature. While the nucleus of the Medical Centre will be the existing group of buildings which form the medical college, Winnipeg General and Psychopathic Hospitals and the Central Tuberculosis Clinic, the teaching facilities of the associated hospitals, especially St. Boniface, will continue to be utilized. The city of St. Boniface and the hospital will be represented on the board set up to administer the Medical Centre. One of the first of the new buildings to be erected will be a teaching hospital unit of 300 to 350 beds so that increased clinical facilities may be provided for medical students. At present the teaching wards at the Winnipeg General Hospital are in the original buildings begun in 1883. A separate maternity building and a research building are included in the scheme. The Children's Hospital and St. Joseph's Hospital are planning to move to this new location. This will lie between Notre Dame Avenue on the south, Tecumseh Street on the west, William Avenue on the north and Sherbrook Street on the east. The Dominion government will erect a neuro-psychiatric unit, the first of its kind in Western Canada, within this space.

The legislature also passed the basic sciences bill, the chiropractors and the osteopaths bills. The first of these provides that students aspiring to enter the ranks of those professing to treat disease, must pass an examination provided by the university in basic sciences. The other two bills provide for the licensing of chiropractors and osteopaths. Members of these cults can advertise themselves only as doctor of chiropractic or doctor of osteopathy respectively.

A three-day refresher course was held in the Medical College on April 2, 3 and 4 with an enrolment of seventy. Chairmen of the various sessions were Dr. F. G. McGuinness, Lt.-Col. J. D. Adamson, Lt. Col. Gordon S. Fahrni and Dr. O. S. Waugh. One of the visiting speakers was Lt.-Col. E. H. Botterell, chief of staff, Neurosurgical unit, Christie Street Military Hospital, Toronto. A former Winnipegger, Lt.-Col. Botterell had five years' service overseas with the Canadian Neurological and Plastic Surgery Hospital in Southern England. The other speakers were Surg.-Commander Wallace Graham, R.C.N.V.R., and Sq. Leader D. P. Murnaghan, R.C.A.F.

Lieut. Col. Cecil W. Clark, R.C.A.M.C., who has been overseas for over five years is home on leave and was a welcome visitor at the Winnipeg General Hospital.

Lt.-Col. Ross H. Cooper, R.C.A.M.C., has been mentioned in despatches for gallant conduct in the field.

At the annual meeting of Victoria Hospital, Winnipeg, it was announced that the $75,000 mortgage had been paid off and that the building and extension fund now totalled over $40,000.

ROSS MITCHELL

New Brunswick

Dr. C. L. Gass, of Sackville, has been confined to his home for a considerable period with rheumatism. Some improvement in his condition has been reported.

Dr. Geo. Skinner was the guest speaker at the March meeting of the Saint John Medical Society. His subject "Gastric ulcer, benign and malignant" was illustrated with lantern slides of recent surgical cases and was met with spirited discussion and much appreciation. A good attendance was recorded.

Capt. Frank Martin, M.C., of the R.C.A.M.C., has returned from overseas and is at present attached to St. James Military Hospital. Capt. Martin was overseas for three years and had very active service in Italy where he won his decoration with an armoured regiment.

Plans are progressing for the erection of a thirty-five bed hospital at Sussex, N.B. The new hospital will be supported jointly by the town of Sussex and the Municipality of Kings County.

Dr. W. W. White, of Saint John, has been re-elected President of the N.B. Division of the Saint John Ambulance Association for the tenth successive year.

The Medical Council of New Brunswick held its spring meeting in the office of the Registrar, Dr. J. M. Barry, March 22, 1945. The prosecution of an irregular pratitioner was arranged for on a recent offence. This unlicensed, unqualified person had been previously fined on conviction in magistrates' court.

Following the receipt of a number of applications for registration in New Brunswick by physicians presently residing in various countries it was resolved that no application for registration in N.B. from outside physicians would be granted until the the N.B. physicians now in the armed services had returned to their civilian practices. At the same meeting Dr. V. D. Davidson and Dr. A. L. Donovan were appointed members of the examination board for the registration of nurses.

Dr. Raleigh D. Smith, Mayor of Saint George, N.B., has been laid up with pneumonia but is presently recovering satisfactorily.

Recent dispatches announce the promotion of Lieut.-Col. D. F. W. Porter, R.C.A.M.C., of Saint John to the rank of full Colonel. At the same time it was announced that Col. Porter had been mentioned in dispatches. Citation is not yet available.

A. S. KIRKLAND

Nova Scotia

Dr. H. W. Schwartz has returned to Halifax and has resumed his practice on a part time basis.

Dr. Robert McLellan of Rawdon Gold Mines, after an extended illness, is once more able to carry on his busy country practice.

In the closing hours of the Legislature the Dawson Report was tabled. This report, made by Dr. R. McGregor Dawson, deals with many phases of Nova Scotia's social and economic life. Included in the list of special interest to the medical profession are comments on the medical care of indigents, county homes and insane asylums, illegitimacy and maternal welfare.

The Workmen's Compensation Act has been recently amended to include silicosis as an industrial disease

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occurring in industries involving the grinding and polishing of metal. It previously had been recognized only in the mining industry.

The maximum yearly wage on which compensation is based was raised from $1,500 per year to $2,000 a year, and the minimum compensation rate was raised to $12.50 a week.

This is the season for renewal of motor vehicle licenses and, incidentally, the doctor's annual application for extra supplies of gasoline. Reports indicate that on the whole the medical profession is satisfied with the allowance given. On its part the profession in this Province has been too busily engaged in doing its work to use gasoline for anything but necessary driving.

Lieut.-Col. T. M. Sieniewicz, formerly the Superintendent of the Halifax Tuberculosis Hospital, has returned from overseas. Col Sieniewicz was Officer Commanding the Medical Department of No. 7 Canadian General Hospital in England and France. He has been assigned to duty in Halifax.

H. L. SCAMMELL

Ontario

Brig. W. P. Warner, 47, of Toronto, is retiring as deputy director general of medical services of the Canadian Army to accept an appointment in the Department of Veterans' Affairs.

A veteran of the Great War where he served with the Royal Navy and won the Distinguished Service Cross, Brig. Warner was a senior officer of the Royal Canadian Army Medical Corps at the outset of the present war. After a period overseas, he returned to Canada in 1940 and for a time was acting director general of medical services for the army prior to the appointment of Maj.-Gen C. P. Fenwick.

Brig. Warner was appointed deputy director general of medical services with his present rank in July last year.

Dr. Gerard Latour, of Ottawa, has taken over the practice of Dr. B. Primeau at Alexandria, Ont. Dr. Latour comes here after serving in the Canadian Army and Navy medical services and he is occupying the offices in the McLeister block vacated by Dr. Primeau some months ago.

Major John R. Calder, of Brantford, who was medical conducting officer aboard ships carrying sick and wounded Canadians from Britain to Canada across the sub-infested Atlantic in 1940, has resumed his medical practice in Brantford. He was on active service for more than four years with the R.C.A.M.C.

The Ontario Cancer Treatment and Research Foundation launched a year ago by the government of the Province has now been organized. Dr. Gordon E. Richards director of the Institute of Radio Therapy, Toronto General Hospital, has been appointed Managing Director of the Foundation.

Brigadier J. A. MacFarlane, O.B.E., Director of Surgical Services, Canadian Army Overseas, has been promoted from the rank of Colonel.

On March 14, the London Academy of Medicine visited the Hamilton Academy. The program was preceded by a dinner at which the Fellows of the two Academies fraternized most happily. Dr. A. D. McLachlin read a paper on "Surgical advances during the present war" and Dr. John Fisher presented "Staphylococcus infections". Both papers evoked stimulating discussion.

M. H. V. CAMERON

Prince Edward Island

Dr. J. A. MacPhee, Summerside, recently attended a meeting of the National War Services Advisory Committee in Ottawa.

Dr. A. R. Grant, Summerside, is attending a refresher course at the New York City Postgraduate School of Surgery and the New York Polyclinic.

Capt. C. F. Hyndman, M.D., Charlottetown, is now serving with the 4th Field Ambulance, C.A.O. in Germany.

Dr. B. C. Keeping, Charlottetown, a veteran of the last war, was recently informed that his son Kimball, has received a commission and is now serving as a Lieutenant with the Royal Canadian Artillery.

At a meeting in Charlottetown, organized to combat the V.D. menace, at which Dr. B. C. Keeping, Deputy Minister of Health presided, the Hon. Dr. W. J. P. McMillan, O.B.E., was elected president. Serving on the Health Committee are Dr. J. A. McMillan, Charlottetown, Chairman, Flt.-Lt. R. H. Kennedy, M.D., Doctors J. A. MacPhee and J. C. Simpson, Summerside.

A. J. MURCHISON

Quebec

Le Conseil de la Faculté de Médecine de l'Université de Montréal, à sa dernière séance régulière, a nommé dix-sept nouveaux professeurs agrégés. Ces nominations sont faites après épreuves de titres et travaux et d'une leçon devant un jury. Les nouveaux professeurs agrégés sont les suivants: René Dandurand, Roger Dufresne, C. Emile Grignon, Georges Hébert, Rodrigue Lefebvre, Jules Prévost, Edouard Desjardins, Charles Hébert, Charles Lefrançois, Paul M. Ricard, Pierre Smith, Jean Tremblay, Paul Bourgeois, Jean-Paul Bourque, C. A. Favreau, Eugène Robillard et Adélard Groulx.

La Société de Phtisiologie de Montréal a élu récemment l'exécutif suivant: président, Dr J. E. Marion; vice-président, Dr J. P. Paquette; trésorier, Dr Marcel Verschelden, et secrétaire des séances, Dr J. L. Pilon.

Le nouveau bureau médical de l'Hôtel-Dieu de Montréal est constitué comme suit: président, Dr R. Gatien; vice-président, Dr J. L. Riopelle, Secrétaire, Dr G. St-Onge. Le bureau exécutif élu fut le suivant: président, Dr J. R. Pépin; vice-président, Dr Oscar Mercier; secrétaire, Dr P. P. Gauthier; conseillers: Drs D. A. Hingston, A. Barbeau, A. Jutras et Paul Poirier.

Le Dr Adélard Tétreault, des Trois-Rivières, a été nommé par le Saint-Siège, Commandeur de l'ordre de St-Sylvestre.

Le Dr Roma Amyot a été nommé rédacteur-en-chef de *l'Union Médicale du Canada*. Le Dr Amyot remplace le Dr Albert Lesage, démissionnaire, qui devient rédacteur-en-chef émérite.

JEAN SAUCIER

Dr. I. M. Rabinowitch, associate professor of medicine at McGill University and director of the department of metabolism at the Montreal General Hospital, has been awarded $2,500 by the Sugar Research Foundation, New York City, as one of six grants made to scientists on this continent. The association sponsors research into new industrial and nutritional uses for sugar. The six awards amount to $45,000, bringing to more than $300,000 the total funds which the foundation has made available to science for this purpose.

The grant to Dr. Rabinowitch is for one year, the money to be used "to study further the body's relative rate of absorption of sucrose, dextrose and levulose". The research will be carried out in the department of metabolism of the Montreal General Hospital.

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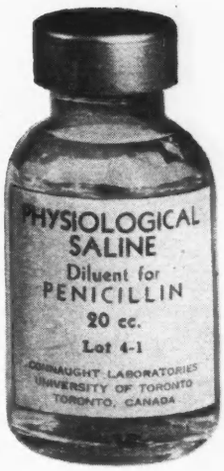

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The foundation making the grant includes growers and processors of cane and beet sugar from the continental United States, Hawaii, Puerto Rico, Cuba, Canada and Haiti. Joseph F. Abbott, of New York, is president of the foundation.

Saskatchewan

Dr. J. V. Millions of Kincaid has opened a practice at Eastend, Sask. Dr. Millions has practised at Kincaid for two years and before that was in the army for three and a half years.

Eastend has been without a doctor for some time and location of a doctor there is widely welcomed.

Saskatchewan now has six medical officers stationed at civilian points to relieve the dire need for medical services in the respective areas by arrangement with the C.M.P.A.B. From the R.C.A.M.C. are Captain G. O. Hallman at Lampman, Captain S. J. McEvoy at Gladmar, Captain E. I. Shapiro at Mankota and Captain R. J. P. Belcourt at Kincaid. From the R.C.N. is Acting Surgeon Commander R. G. Bateman at Dinsmore. And from the R.C.A.F. is Flight Lieutenant H. Hirt at Eatonia.

Three more of our Saskatchewan doctors have departed recently for British Columbia. Dr. J. T. Cooper who practised for many, many years in Saskatoon has retired to Victoria; he was entertained on several occasions before his departure. Dr. E. Gorelick, formerly of Maryfield, Sask., has settled in New Westminster. And Dr. L. K. Baker, of Viscount, has joined his brother, Dr. S. W. Baker, at Ladysmith, B.C.

We welcome to the Province a new registrant, Dr. Jack C. Creasy, M.D. Manitoba 1945, who is associated with Dr. F. D. Sutherland at Tisdale.

Dr. W. H. Hicks who was with the R.C.A.M.C. for almost four years has returned to civilian practice and is with the Department of Pensions and National Health at Saskatoon.

H. D. HART

General

As the result of a nationwide poll among leaders in medical science, Dr. Edwin J. Cohn, Professor of Biochemistry at Harvard University, has been chosen as the first winner of the Passano Foundation award. Presentation of the $5,000 cash award will be made at an appropriate ceremony in historic Osler Hall of the Medical and Chirurgical Faculty of Maryland, in Baltimore, on the night of May 16.

Gliders Carry Wounded to Hospitals.—A glider service was inaugurated in the European theatre in March to evacuate wounded from Remagen. Observers reported that the shock incident to being "snatched" into the air was absorbed by an improved towing device. It is now possible that gliders may almost eliminate ambulances for hauling our battle casualties long distances over shell torn roads, giving them a faster, smoother ride to the hospital.

The gliders serve a dual purpose. Coming in to the battle area they can carry twelve litter patients or nineteen walking wounded.

Ambulance gliders were first used experimentally by the British in Burma and New Guinea.

One Hundred and Ninety-three Thousand Pints of Blood Flown to Wounded.—Combined figures on East and West coast flights of whole blood to the war theatres reached 193,000 pints in March according to the Office of the Surgeon General. Since the start of the blood-flying program over the Atlantic last August, 150,000 pints of whole blood have been flown from the East Coast to the European theatre. This service has made it possible for a wounded man to get blood within 24 hours after it was drawn from a donor here. Shipments now average about 1,200 pints a day—which provides transfusions for three to four hundred average cases.

Whole blood shipments being flown from the West Coast to the Pacific Ocean Area have totaled 43,000 pints since the inauguration of the service last November.

Continued donations of type "O" whole blood are necessary to maintain this life-saving service.

The Health League of Canada, jointly with the Canadian Pharmaceutical Association, and in co-operation with health departments, is sponsoring a special "Stamp Out VD" campaign, May 21 to 26. This campaign is part of the Health League's continuous anti-VD program.

In connection with this there will be a nation-wide drugstore window display scheme, with 3,865 operating druggists being asked to co-operate.

Book Reviews

The March of Medicine in Western Ontario. E. Seaborn, M.D., F.A.C.S., LL.D., University of Western Ontario. 386 pp., illust. $6.00. Ryerson Press, Toronto, 1944.

Dr. Seaborn has carried out a historical task of great value. Anyone who is interested in Canadian medical history realizes how scanty are the records of our earliest medical men. The great mass of general practitioners, which of course is what they all were, are not known except by a few traditional stories. We can reconstruct the primitive conditions under which they worked, but we would like to know more about their lives. This gap Dr. Seaborn has helped to lessen very considerably for Western Ontario, both by searching available records, and, what is more valuable, and in some respects, much more difficult, by personal interview and correspondence. The picture of pioneering days always includes the figure of the quack, and this is no exception. The book includes many lively incidents, from the fight between a doctor and the husband of one of his patients, to the accounts of the various epidemics of cholera and small pox.

The style is somewhat disconnected, but it is difficult to see how that can be overcome in a record such as this. It may be agreed that the book will take its place amongst the sources for Canadian medical historians.

Rehabilitation of the Tuberculous. H. A. Pattison. 194 pp., illust. $2.50. Livingston Press, Columbia County, New York, 1944.

This book as a whole gives ample evidence of wide experience and originality of thought in this field of tuberculosis treatment. Many perplexing problems of rehabilitation are dealt with in a very able manner. There is, however, much extraneous material in the book which would be good if included under another heading. The main criticism seems to be that the rehabilitation centre is considered as an independent unit rather than a continuation of, an integral part of, sanatorium treatment. Some points are laboured to boredom; others are left incomplete; the balance is not good. Undue prominence is given in a few instances to personal antipathies. The cohesion is not good.

Statistical Methods for Research Workers. R. A. Fisher, Fellow of Gonville and Caius College, Cambridge. 9th ed., 350 pp. 16s. Oliver & Boyd, Edinburgh, 1944.

One need hardly point out that this book is the standard classic for biological statistics. With present day emphasis on the analysis of any data presented for publication this simplified presentation has become valuable not only to laboratory workers, but also to clinicians who would draw conclusions from any series of cases.